Data used for
Paper Published 1968

Papers Archaeol. Soc. New Mexico
No. 1; 115-128

"Limb Measurements of the
Extinct Vulture Coragyps
occidentalis; with a
description of a new subspecies."

UNIVERSITY OF CALIFORNIA, BERKELEY

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

Reply to:
MUSEUM OF VERTEBRATE ZOOLOGY
2593 LIFE SCIENCES BUILDING

BERKELEY, CALIFORNIA 94720

October 27, 1967

Dr. Hildegarde Howard
Los Angeles County
Museum of Natural History
900 Exposition Blvd.
Los Angeles, California 90007

Dear Dr. Howard:

The data you requested on the Coragyps occidentalis (UCMP #12509) tarsus is as follows:

A. Greatest length: 82.5 mm
B. Greatest proximal breadth: 17.1 mm
C. Greatest distal breadth: 17.3 mm
D. Least breadth of shaft: 7.5 mm

It was good to hear from you and I'm glad to be able to help you out.

Say hello to everyone there for me.

Sincerely,

Bill

BA:jd

Bill Arvey
Assistant to
the Curator

Select Category	Length	dist	water	P/F	jaw	sh. Length	Ratio	dist
D9160	146.7	14.3	9.7	– P3	—	8.5	5.8	9.7
D9744	151.8	14.4	9.5	– P2	19.0	8.8	5.8	9.5
D7440	147.0	13.7	9.3	– P4	—	8.6	5.8	9.3
B577	148.3	15.4	10.0	> P3	18.7	9.4	6.3	10.1
D7417	147.4	14.3	9.7	– –	18.0	9.4	6.3	9.6
D8822	148.8	14.3	9.6	– P3	—	9.3 sh.	6.2	9.4
D7717	141.6	14.7	10.3 X	– P4	17.8	8.8	6.2	10.3
D7570	138.2 X	13.6	9.8	– P4	—	9.0 sh.	5.7	9.8
D9564	138.2 X	14.8	10.7	– P16				10.6
D7036	144.0 X	14.3	9.9	– P4				9.9
D7473	142.4	14.1	9.5	– P4	17.4	8.1 sh.	5.4	9.5
F1840	140.7 X	15.4	10.9		—	9.7 sh.	6.6	10.9
D7568	143.7 X	13.7	9.5	– P4	—	8.3 sh.	5.7	9.5
D7465	147.4	15.0	10.1	– P4	19.1	9.1 sh.	6.5	10.1
D9268	152.2	15.7	10.3	– P16	—	10.0 sh.	6.5	10.2
D9310	153.0	14.4	9.2	– P16	18.1	9.2 sh.	6.0	9.2
D9263	147.4	14.5	9.8					
D8066	146.5	14.1	9.6					
D8571	143.3	14.2	9.9					
D8334	138.7	14.5	10.4					

19 2336 4 (16) 15 9.4 (9.9 128.1 127.9 148 5 7 (6 148.3 9.5 1578

M 146.0 16 73 64 96 96 Total 12315 144 134 144

2336.4 / 20 = 116.8 — 573 / 20 = 28.9 — 397 / 159.4 / 34 = 14.4 — 2y 199 (9.9 180 191

29123 / 145.6 — 9.9

sas'd	a long	b wid	c wid	d bill	ba	ca	da	Cross-Farm Pct
	86.0	18.5	17.6	8.0	21.4	20.4	9.3	P16 ✓
7211	82.1	17.9	16.7	7.5	21.8	18.8	9.1	P4 ✓
D7194	84.7	18.0	16.9	7.2	20.0	18.9	8.8	P4 ✓
D7416	88.7	17.7	16.7	8.1	19.9	18.8	9.1	P4 ✓
E486	83.9	18.1	16.8	7.5	21.5	20.0	8.9	P67
D7419	84.8	17.0	16.5	7.3	20.0	19.4	8.4	P4 ✓
D7273	81.0	16.6	—	7.0	20.4	—	8.6	P4 ✓
D8407	80.0	17.0	15.8	7.2	21.2	19.7	9.0	P4 ✓
D9251	81.8	16.7	17.2	7.6	20.4	21.0	9.2	8.6
D8573	80.3	17.2	16.5	8.d	21.4	20.5	9.9	P3 ✓
D7290	82.5	17.4	16.1	8.0	21.4	19.5	9.7	P4 ✓
D9171	86.0	17.3	16.8	8.2	20.1	19.5	9.5	P3 ✓
D8742	80.4	17.0	16.4	?.x	21.1	20.4	9.2	P3 ✓
D7221	82.8	16.5	16.0	7.2	19.9	19.3	8.7	P4 ✓
D9136	80.4	17.5	17.0	7.5	21.7	21.0	9.3	P3 ✓
D9020	85.3	18.2	17.4	8.2	21.3	20.4	9.6	P3 ✓
D8439	78.3	17.1	16.7	7.6	21.8	21.3	9.7	P3 ✓
D9027	81.3	17.0	15.8	7.0	20.9	19.4	8.6	P4 ✓
D8143	83.9	17.7	16.4	7.5	21.1	19.5	8.9	P3 ✓
D9036	83.4	18.0	17.4	7.9	21.6	20.8	9.4	P4 ✓
D7614	84.5	18.0	17.0	8.0	21.3	20.1	9.4	P4 ✓
D7212	79.6	18.1	17.4	8.1	22.7	21.8	10.1	P16 ✓
D9562	79.1	17.9	17.1	8.2	22.6	21.6	10.3	P4 ✓
D8008	82.4	17.0	16.3	7.4	20.6	19.7	8.9	P4 ✓
D8068	83.3	17.3	16.8	7.7	20.8	20.1	9.2	P16 ✓
D9532	82.8	17.0	16.6	7.4	20.5	20.0	8.9	P4 ✓
D7405	81.4	16.9	17.4	7.5	20.7	21.3	9.2	P3 ✓
D8524	81.0	17.3	16.3	7.5	21.3	20.3	9.2	P3 ✓
D8975	84.3	17.7	17.2	8.0	21.0	20.4	9.8	P13 ✓
E214	81.3	17.3	16.6	7.5	21.2	20.4	9.2	
25)	2071	7			258	165	232	
	82.8				21.0	20.2	9.3	

	Length	Width	Depth	Beak	ba	ca	da	Cross-Farm Pct
D7435	80.4	16.6	16.9	7.6				
D8574	80.8	17.7	16.7	8.0	21.8	20.6	9.9	P4 ✓
D7431	80.5	16.2	16.0	6.8				
D7471	80.0	16.1	16.9	7.7	20.1	21.1	9.3	P4 ✓
D9719	81.2	17.0	16.8	8.0	20.9	20.6	9.8	P4 ✓
D8570	86.1	18.0	17.9	8.1	20.8	20.8	9.4	P16 ✓
G2491	84.1	18.2	17.7	8.4				
J9976	79.1	17.8	17.0	7.8	22.5	21.4	9.8	P4 ✓ P67
E558	83.4	17.8	16.5	7.7				
E31	87.2	17.7	17.8	8.1	20.3	20.4	9.3	P77
G2475	83.0	17.3	16.2	7.4	20.8	19.5	8.9	P791
E419	82.2	17.6	16.4	7.9	21.4	20.2	9.6	P61
E398	83.3	17.4	17.2	8.3				P11
E304	82.7	17.2	17.0	7.6	20.7	20.5	9.1	P13 ✓
E241	82.4	18.2	16.9	8.1	22.7	20.5	9.8	P13 ✓
E537	81.8	17.6	16.9	7.9	21.5	20.6	9.6	P13 ✓
D7696	85.4	17.6	17.2	7.7	20.6	20.1	9.0	P4 ✓
D8160	85.1	18.0	17.7	8.2	21.1	20.8	9.6	P4 ✓
D8718	84.3	17.8	16.6	7.7	21.1	19.7	9.0	P3 ✓
D8888	79.8	16.8	16.3	7.0	21.0	20.4	8.7	P3 ✓
D7163	84.1	17.8	17.4	7.5	21.1	20.6	8.9	P4 ✓
D9559	84.8	17.2	17.6	7.7	20.2	20.7	9.0	P16 ✓
D8463	81.4	17.1	16.6	7.6	21.0	20.4	9.3	P4 ✓
D8559	82.4	17.7	16.5	8.0	21.4	20.0	9.7	P3 ✓
D9329	84.3	18.7	17.8	8.2	22.2	21.1	9.7	P16 ✓
D7797	80.3	16.8	16.3	7.4	20.9	20.2	9.2	P4 ✓
D7834	84.6	17.3	16.3	7.9	20.4	19.2	9.3	P4 ✓
D9757	86.4	17.7	17.0	7.6	20.5	19.4	8.8	P2
D9774	81.7	17.9	16.9	7.6	21.9	20.6	9.3	P2
G2472	80.4	17.4	16.9	7.6	21.6	21.0	9.4	P36
25)	2077	5			526	510	234	
	82.8				21.1	20.4	9.3	

225

Mckit Cor. occidentalis 10.3.67

	Talus length	Br post dist	Br dist	dist br sr	Rathke's post dist	dist	sr br
Left	84.6	17.2	18.3	8.5	20.3	21.6	10.0
Right	90.4	16.8	18.9	7.5	18.6	20.8	8.3
Left	84.6	17.4	18.4	8.5	20.3	21.7	10.0
3)	259.6						
	86.5						

Coracoid

	Br bucc hip	Br dors.	Br dist
Right	66.9	13.1	9.1
"	67.5	12.5	8.9
"	66.4	12.4	8.0
"	63.7	12.3	8.0
M=66.1	264.7	50.3	34.0

Park Canyon Cave

	Br prox ulna	Br post tibia	Br sr	Br ulna	Br Rat tarsal	Br sr
13DC	30.9					
19DC		16.7	9.7	15.5/9.9		
15DC				13.3/9.9		
16IDC					17.4	
16DC				13.8/9.0		9.2
12DC						

RLB Sternum C. oc. vs Recent C. atratus 10.3.67

RLB	Br. bet costal proces 1 r 2	complete length to xiphoid in mid.	Br back of last costal pcss.	Depth to bottom of Keel
D7208	44.4	96.6	48.8	46.6
D7694	46.6	—	50.7	48.3
D7069	44.8	—	49.4	✓

Recent				
1139	43.4	95.7	47.1	45.5
228	43.7	95.9	44.8	44.4
714	42.3	83.8?	45.0	37.9
1360	40.0	80.8	43.5	38.7

Table 2 Humeri

		C. atratus	(42 bones) Rancho La Brea	Coragyps occidentalis San Josecito Cave	Conkling Cavern[a]	Dark Canyon	MCK (3) actual mea.
Greatest length	max.	142.2	155.9	148.5			
	aver.	135.4	148.0	144.3 (10)	148.0		
	min.	124.8	142.6	139.1			
Breadth proximal end across internal & external tuberosities	max.	27.9	32.4	31.3			
	aver.	26.4	30.6	30.6 (9)	30.3	29.8	32.8, 31.0, 30.2
	min.	24.7	28.5	29.8 (7)			
Distal breadth	max.	25.7	29.1	28.1			
	aver,	24.2	27.4	26.9 (9)	27.5		
	min.	22.5	26.1	24.9			
Least breadth shaft	max.	10.8	12.4	11.8	(11.6 for complete one) 11.9 many		
	aver.	10.1	11.5	11.4 (10)	11.4 mean		
	min.	9.5	10.8	11.0	(11.2 - min)		
Ratio prox. breadth to length	max.	20.9	21.9	22.0			
	aver.	19.5	20.6	21.0	22.5		
	min.	17.9	19.5	20.3			
Ratio distal breadth to length	max.	18.3	19.4	19.7			
	aver.	17.8	18.2	18.6	18.6		
	min.	17.1	16.8	17.8			
Ratio shaft breadth to length	max.	8.0	8.5	8.4			
	aver.	7.4	7.7	8.0	7.9		
	min.	7.0	7.2	7.4			

[a] One complete humerus (LACM no. 34) plus 6 fragments (breadth of shaft shown in pare

6 only one This small, of remains min. is 139.6

rel to sh. 8 (of 10) greater than mean of RLB

rel to dist 7 (of 9) are above. 2 below mean

Ratios of L: prox 2 below mean dist 1 above mean

5 above mean, 2 = mean (7 total)

lengths many shorter mean 2 roughly min 6 of 10

No humeri in ranges length of C. atratus

SJC ratios

prox/dist	dist/dist
20.3	18.1
22.0 ?	18.4
20.9	18.5
20.9 -	19.7 ?
21.1	18.1
21.7	18.4
20.6	18.7
21.2	17.8 -
	18.0
	18.7
	18.9
	18.0
	18.8
	18.8

8)168.7

21.0

11 9 7

14)259 (18.5

14

119

112

70

Coragyps occidentalis RLB compared to C. atratus
Measurements of Humerus

RLB	Greatest length	Proximal breadth across int.&ext tuberos.	Distal breadth	Least breadth shaft (thickness)	Ratios to length (%) Prox.	Dist.	Shaft
Specimens of maximum length							
D8154	155.9	30.5	27.0	11.5	19.5	17.3	7.4
D8292	154.2	30.9	28.3	11.8	20.0	18.3	
~~D9421~~	~~153.8~~	~~32.4~~	~~29.1~~	~~12.4~~			
Specimens of minimum length	149.9 per each in meas.						
~~D8076~~	~~140.1~~	~~30.3~~	~~27.2~~	~~11.1~~	~~20.2 21.5~~		
D9745	142.6	30.3	27.5	11.8	21.2	19.3	8.2
D7458	142.9	30.3	27.2	11.1	21.2		
Maximum measurements and ratios in a series of 42	155.9 (142.2)	32.4 (27.9)	29.1 (25.7)	12.4 (10.8)	21.9 (20.9)	19.4 (18.3)	8.5 (8.1)
Mean measurements and ratios in a series of 42	148.0 (135.8)	30.6 (26.4)	27.4 (24.2)	11.5 (10.1)	20.6 (19.5)	18.4 (17.8)	7.6 (7.4)
Minimum measurements and ratios in a series of 42	142.6 ~~140.1~~ (124.8)	28.5 (24.7)	26.1 (22.5)	10.8 (9.5)	19.5 (17.9)	17.3 (17.1)	7.2 (7.0)
RECENT C. atratus							
LACM 228 (maximum length)	142.2	27.5	25.0	10.3	19.3	17.5	7.0
LACM 1360 (minimum length)	124.8	24.7	22.5	9.5	19.8	18.0	7.6
Average measurements and ratios in series of six	135.4	26.4[a]	24.2[b]	10.1[c]	19.5[d]	17.8[e]	7.4[f]
C. atratus Santa Cruz Is.	149.3 - 136.9	27.7 - 29.4	26.1 - 27.5	11.3 - 12.6			

[a] maximum and minimum measure,ents of proximal breadth, 27.9 and 24.7
[b] maximum and minimum measurements of distal breadth, 25.7 and 22.5
[c] maximum and minimum measurements of least breadth of shaft, 10.8 and 9.5
[d] maximum and minimum ratios, 20.9 and 17.9
[e] mixiumum and minimum ratios, 18.3 and 17.1
[f] maximum and minimum ratios, 8.1 and 7.0

Conklin Cavern
#134
six adults

147.9 30.3 27.5 11.8
11.5-12.5

Brazil atratus
Shasta Co.

23.7
illus.
12.4

Sept. 26, 1947

RLB Numenius Cotagus occidentalis

v = measured earlier also (for CC study)

* = 149.9 on CC study, measured probably OK

a guess from lesser measurements given with it (6 to pectoral crest)

Specimen	Age & sex	Bill from feathering to tip	Bill from nostril to tip	Bill from base of skull to tip	Width of bill at nostrils	Width of bill at tip	Ratio: width at nostrils / length	Remarks
E21 (P27)	imm.	148.7	—	—	11.9	43.9	36.2	8.0
D7393	P4	148.0	29.7	27.1	10.9	20.0	18.3	7.3
✓ D9941	P16	152.9	31.7	28.4	11.7	20.7	18.5	7.6
✓ D9732	P2	144.3	29.5	26.1	10.9	20.4	18.0	7.5
D8355	P4	148.4	30.4	26.9	11.0	20.4	18.1	7.4
D7149	P4	145.8	30.4	26.8	11.2	20.8	18.4	7.6
D7316	P4	142.2	31.3	27.9	11.4	21.2	18.9	7.7
✓ D7442	P4	153.1	31.4	27.7	11.2	20.4	18.0	7.3
D9745	P2	142.6	30.3	27.5	11.8	21.2	19.3	8.2
D9256	P16	143.7	28.5	~~25.1~~	11.1	19.8	~~17.1~~	7.7
D8518	P3	147.8	31.7	27.4	11.7	21.4	18.5	7.9
✓ D9243	P16	147.3	31.3	27.8	11.6	21.2	18.8	7.8
D8319	P4	146.9	30.3	27.0	11.8	20.6	18.4	8.0
D7209	P4	150.1	31.1	27.3	11.4	20.6	18.1	7.5
✓ D8897	P3	147.1	31.2	28.7	12.3	21.2	19.4	8.3
D7030	P4	145.6	30.3	27.4	11.6	20.8	18.8	7.9
✓ D7915	P4	145.8	30.6	26.5	11.8	20.9	18.2	8.0
✓ D8263	P4	150.1	30.6	27.0	11.4	20.3	17.9	7.5
D9778	P16	146.8	31.4	27.8	11.8	21.4	18.9	8.0
E353	P61	153.2	31.4	28.2	12.1	20.4	18.4	7.9
D7423	P4	148.6	30.4	26.8	11.3	20.4	18.0	7.6
D8292	P4	154.2	30.9	28.3	11.8	20.0	18.3	7.4
D8667	P3	146.6	30.4	27.4	11.3	20.7	18.7	7.7
D7295	P4	153.0	31.6	27.7	11.8	20.6	18.1	7.3
✓ D9741	P2	149.1	29.6	26.8	11.0	19.8	17.9	7.3
✓ D9552	P16	144.7	31.8	28.2	12.4	21.9	19.4	8.5
D7258	P4	151.4	30.7	26.9	11.0	20.2	17.7	7.2
✓ D8124	P4	143.4	29.2	27.1	measured 11.5	20.2	18.8	8.0
D8531	P3	147.8	29.4	27.3	12.0	19.8	18.4	8.1
D9421	P16	153.8	32.4	29.1	12.4	21.0	18.9	8.0
+D8154	P4	155.9	30.5	27.0	11.5	19.5	17.3	7.4
E384	P3	150.2	31.1	28.5	11.8	20.7	18.9	7.8
D8538	P3	146.7	29.8	26.9	11.4	20.3	18.3	7.5
D7218	P4	148.3	30.8	27.4	11.6	20.8	18.4	7.8
D9068	P3	149.2	30.7	28.5	11.5	20.5	19.1	7.7
E393	P61	147.3	29.6	26.5	11.5	20.0	17.9	7.9
~~✓ D8076~~	~~P4~~	~~150.0~~	~~30.3~~	~~27.2~~	~~11.1~~	~~20.1~~	~~18.0~~	~~7.8~~
E365	P61	144.3	29.6	26.6	10.8	20.5	18.4	7.4
D8485	P3	146.9	30.9	26.7	11.6	21.0	18.8	7.8
E379	P61	148.8	30.7	27.7	11.9	20.6	17.8	8.0
D7702	P4	149.2	29.9	26.7	11.8	20.0	17.9	7.9
✓ E43	P13	149.9	31.8	27.8	11.9	21.2	18.5	7.9
D7458	P4	142.9	30.3	27.2	11.1	21.2	19.0	7.9

(from CC study)

RLB humeri

	length	prox	dist	sh	nat prox	nat dist	nat sh
D9549	149.7	32.0	27.9	12.3	21.4	18.6	8.2
E379	148.7	31.6	22.7	12.2	21.2	18.6	8.2
D7767	150.0	31.9	27.5	12.0	21.2	18.3	8.0
D9610	148.7	31.1	27.4	11.7	21.0	18.4	7.8
D7775	145.7	31.0	26.8	12.1	21.2	18.2	8.3
D8927	142.0	32.1	27.4	11.8	21.8	18.7	8.0
D8124	143.3	30.5	26.8	11.5	21.2	18.7	8.0
D7015	152.29	—	25.7	11.1	—	16.8	7.3
	1185.3	22.02	217.2	94.7	(7) 1498	(8) 1463	638

(6228.9)

7414.2

(21 434.1 361.2 21) 170.2

21 430.5 387.2 (20) 170.3

49) 1013.6 894.7 52) 404.3

49

15.23

148.7

148.3

52) 7715.2

52

251

208

435

416

192

20.6

49) 1013.6

98

336

294

42

18.2

49) 894.7

49

404

392

12

7.7

52) 404.3

364

403

2 8

Totals of humeri

left	prox	dist	sh	ratio prox	rat dist	rat sh
3268,2	6364	5486	2537	4341	3742	1763
3271,7	6411	5762	2539	4364	3862	1702
1185,3	2202	2172	947	1490	1463	638
7725,2	14977	13420	6023	10135	9067	4043

52)7725,2 49)14977 49)13420 52)6023 49)10135 49)9067 52)4043

left

148,5
52)77252
52
252
208
445
416
292
260

prox

30,6
49)14977
147
277
276

dist

27,4
49)13420
98
362
343
190
6

sh

11,5
52)6023
52
82
52
303

ratio sh

7,7
52)404,3
364
403

ratio prox

20,6
49)10135
98
335

rat. dist

18,5
49)906,7
49
416
392
247

H1012 Granados, Sonora 1953 (Nov. 22) Lowdead
(wash at northedge) D. R. Phillips

Coragyps atratus

H857 Valley Rd., region so. of Tucson Ariz. Nov. 18, 1939 (Phillips) Lowdead

	gr. br cran.	br indented area above ear below dorsal surface	length cran. to raised areas ant. leg of middle process	length of [illegible] stands just anterior to ant. rim	length beaks to lateral sides of rings	length beak (middle)	length nare	Humerus length	Humerus br prox ext to int tub.	Humerus br dist	Ulna gr. length	Ulna br prox	Carpus length ext. cnem. to distal end of MII	Carpus Length M1 to int. cnem	←coracoid length mid sternal end	coracoid br head	Scap. length to hea-	Femur Br	Femur HT	
Hargrave H1012	36.6	33.x	50.3	21.9	60.8	64.5	28.1	134.2	28.7	25.2	153.2	15.7	74.4	20.0	58.4	11.7 (12?)	25.1	57.5	50.4	
H857	38.1	32.6	50.0	23.1	61.3	65.5	26.7	134.5	27.8	24.7	152.3	15.5	72.1	20.0	57.1	12.5	24.4	53.4	50.8	
H1012	Femur int length	Femur br dist	←Tibia length tarsic surface	Tibia br prox artic	br dist condyls	←Tarsus length	Tarsus br prox	Br dist	gr. length [illegible] broken	Sternum br 12th rib to rib on body	by at last rib attach	←P length sacrum	pelvis length br pelvic ant.							
A1012	81.3	20.7	136.5	16.0	12.4	83.1	15.1	16.8	83+	42.3	45.8	80.6	25.0							
H857	81.5	20.3	139.3	15.7	13.1	82.6	15.6	16.8	86.8	41.4	46.1	79.3	26.3							

Hargrave meas. not in Pub. of 1968 by HT

Coragyps atratus Lacm Recent coll.

Femur Coracoid Ulna Tarsus

	a Out length	Femur gr dist to	Femur least br sh	Br dist to ext. condyle	Br dist to ext. cond.	Least br dist to ext. cond. / Depth dist sh at this level	Rat br sh	Rat dist	gr length	Length to coracoid ULNA	Br prox	Br dist thru tuber Ratio	Depth Ext cnem of tibiotar	Least br sh	Ratio br sh	112 90 fem prox	110.0 111.2 ulna	110 carpo 4	115 Tarsus 4
1739	86.3	21.0	9.5	17.0	87.0	24.1	10.9		161.3	150.6	16.7	5.3	13.4	8.0	4.9				
1360	77.9	19.0	8.6	14.9	29.2	23.9	10.8		145.0	136.9	14.4	5.1	11.8	7.0	4.8				
716	83.5	20.3	9.3	16.4	84.7	23.9	10.9		157.3	147.7	15.4	5.2	12.9	7.8	4.9				
228	86.5	21.0	9.4	16.5	87.9	23.9	10.9		160.4	150.3	16.5	4.7	13.3	7.1	4.4				
H857 Hargrave H1012	81.3	20.3	9.4	16.9	82.8	24.5	11.3	10.8	624.0		15.3 av.				4.7 av.				
	81.0	20.8	9.1	16.9	83.1	24.9	10.9												
Mills 245	86.0		8.9		86.0		10.3		H857 Hargrave H1012	152.2	141.7	15.6	4.0	12.2	7.5	4.9			
731	83.9		9.2		83.9		10.9			153.2	142.8	15.7	4.5	12.2	7.3	4.7			

Coracoid

	Length to tip a	Scapular facet dist to *	Br sh below head c	Br sh below process	Length back to tip C	Depth sh inferior process	Ratio BC
1739	62.6	27.0	11.6	7.8	60.7	6.6	19.1
1360	56.6	23.1	10.4	6.4	55.6	5.5	18.7
716	59.4	25.1	10.5	7.0	59.0	6.1	17.8
228	61.9	25.8	11.3	6.9	60.6	5.8	18.6
old mean 1739	62.6		11.4	7.9	58.9		
1360	56.7		10.4	6.7			
716	59.7		10.5	7.1			
228	62.6		11.2	7.1			
245	61.2		10.5	7.3			
731	59.7		10.3	7.2			

	gr length	Length to coracoid	Br prox	Br dist thru tuber	Depth Ext cnem of tibiotar	Least br sh	Ratio br sh
H857 Hargrave H1012	58.1	24.0	10.9	7.6	57.0	6.7	19.1
	60.3	24.8	10.0	7.5	58.3	6.7	17.1

Coragyps occidentalis = atratus — Tarsus — Humerus — Tibia — Carpus — Haugrave meas. Not in Pub 9, 1968 By HH

	gr length	prox br	dist br	dist br / shaft br	Ratios prox	Ratios dist	Ratios br / shaft	Tibia length to artic surface	Tibia prox br.	Tibia (carpal) dist br, across condyles	Depth dist ext	Depth dist ext.	Ratio br to dpt tibia	Ratio M to dist	Ratio Tarsus	Ratio Carpus	Ratio Humerus	Ratio Tibia
Tarsus																		
Tarsus																		
Tarsus																		

(figures in paren indicate number of specimens measured fro length)

Femora of Coragyps occidentalis

		C. atratus (6)	RLB (25)	Conkling Cavern	San Josecito Cave (16)
Length from articular surface to external condyle	max.	87.9	101.2		94.7
	mean	84.7	95.01		91.41
	min.	79.2	90.9		85.6
Breadth distal end	max.	21.0	24.1		22.9
	mean	20.3	23.4		21.7
	min.	19.0	21.1		20.4
Least breadth shaft	max.	9.6	11.3	10.4	10.6
	mean	9.1	10.43	10.3 (3)	10.0
	min.	8.6	9.80	10.0	9.5
Ratio breadth shaft to length	max.	11.1	12.0		11.4
	mean	10.8	11.0		11.0
	min.	10.3	10.3 9.7		10.4

ratio b diaeno 24.3

lengths means max min
420 -420 -390

Ratio	10.5	11-11.4	11.5-11.9	12.0
Mey 16	IIII II	IIII IIII		
RLB III	IIII II	IIII IIII	II	I

Coragyps occidentalis vs C. atratus

FEMUR

		RLB (25)	(3) Conkling (actual meas. of the 3)	(6) C. atratus	San Josecito
Length, a to articulation to external condyle	max.	98.9		86.3	94.7
	mean	93.6		83.8	91.2
	min.	87.6		77.5	85.6
Least breadth shaft	max.	11.3	10.5	9.8	10.6
	mean	10.4	10.3	9.2	10.0
	min.	9.8	10.2	8.7	9.6
Breadth distal end	max.	24.1		21.0	22.9
	mean	23.4		20,0	21.7
	min.	21.1		19.6	20.4
Ratio to length b Sh. br.	max	12,0		11.1	11.4
	mean	11.0		10.8	11.0
	min	10.3		10.3	10.4
~~dist end~~ distend to length b	max	25.2		24.1	25.2
	mean	24.1		23.7	24.0
	min.	22.3		22.8	23.6
length b artic to ext condyle	max.	101.2		87.9	94.7
	mean	95.0		84.7	91.2
	min	90.9		79.2	85.6

Lumb Cor. & RLB 10.3.67

a b greatest 2 condyles as

Ratio

	Bayt head to int cond	Bayt ant. to ext cond	Bayt dist trochl	Bayt sh. least	Dist to a	Sh. to a	dist to b	sh. to Bayt	A Bayt	B Bayt	Bayt	sh			Bayt to b	Bayt to sh
D7407 P4	95.6	97.3	22.0 / 18.3	10.7			22.3	10.6								
C5578 P4	95.2	97.4	23.0 / 19.3	10.6			23.4	10.8								
D8157 P4	89.2	90.1	22.3 / 18.6	10.0		+	24.9	11.1								
D7503 P4	95.6	97.4	24.1 / 19.9	10.9		+	24.7	11.1								
D8910 P3	97.3	98.1	23.5 / 19.2	10.9			23.9	11.1								
D7501 P4	96.3	98.3	23.0 / 18.9	10.1			23.4	10.3								
D9198 P4	99.0	99.7	23.3 / 19.3	10.8			23.3	10.8								
D8129 P4	96.0	97.0	23.9 / 19.1	10.5		+	24.4	10.8								
D8122 P4	90.7	91.8	23.0 / 18.9	10.3		+	25.0	11.2								
D9129 P3	87.4	88.8	21.1 / 17.4	9.8			23.8	11.0								
E44 P3	93.0	95.2	23.9 / 20.1	10.7		+	25.1	11.2								
D8175 P4	90.2	91.0	21.6 / 18.3	10.1			23.7	11.1								
D9186 P14	90.8	92.3	23.0 / 19.8	11.1		+	24.9	12.0								
D7580 P4	91.5	93.0	22.5 / 19.1	10.2		+	24.2	10.9								
E348 P4	96.3	97.1	22.6 / 18.5	10.6			23.1	10.9								
D7377 P4	95.5	96.5	23.8 / 19.2	11.1		+	24.6	11.8								
D8434 P3	97.0	98.6	24.1 / 20.1	10.7		+	24.4	10.9								
D9231 P3	98.9	101.2	24.1 / 20.0	10.6			23.9	10.4								
18	1695.7	1720.8	411.0	188.4			433.9	197.7								
94.2	162 / 75 / 87															

	A Bayt	B Bayt	Bayt	sh				
D9743 P2	96.9	98.6	23.5 / 19.2	10.3			25.7	10.4
D7566 P4	89.3	91.2	21.8 / 18.0	10.1			23.9	11.0
C4962 P4	90.8	92.5	22.8 / 18.2	10.3		+	24.7	11.3
E4134 P4	90.1	91.4	23.1 / 19.4	10.5		+	25.2	11.4
D8525 P3	93.3	94.7	22.7 / 19.5	10.8			24.0	11.4
D7125 P3	89.9	90.9	22.7 / 18.7	10.3		+	25.0	11.3
D8125 P3	95.4	96.1	— / 19.8	11.3			—	11.7
M = 93.4	6457 / 16957 / 2340 / 225 / 90	6550 / 17208 / 23758 / 24 / M 93.0	1456 / 4150 / 561 / 48 / 8	736 / 1884 / 2620 / 10.4			1465 / 4334 / 5799 / 48 / 99 / 96 / 30	783 / 1867 / 2653 / 11.0
P77 J9581	94.0		22.9 / 19.2	10.4				11.0
J9576	92.8 inc			10.4				10.9
D9929	96.7	84.7		10.6			23.7	
	1907 / 838	5087	200	M 9.2			6) 1423	10.8
Total 6	5031	6) 1205	6) 554				6) 651	
Recent 1739	86.3	87.0	20.8 / 18.2	9.5			24.0	10.9
228	86.2	87.9	21.0 / 169	9.8			23.9	11.1
716	83.2	84.7	20.3 / 17.0	9.3			23.9	10.9
1360	72.5	79.2	18.8 / 19.6	8.7			23.7	11.0
2445	86.0	83.9	20.0	8.9			22.8	10.3
731				9.2			23.9	10.9

92.8

6) 557 / 63 / 84

D 41
23.4
23.4
23.9
4) 95.8 | 23.9
8
15
12
38

11.10.67 RLB femora cont'd

	length artic facet to ext (dist)	Br dist end gr. & condyles	Br shaft (least	Ratio sh/length	Ratio gr br dist				length	Br dist gr condyles	Br shaft	ratio N	ratio gr br dist							
D7457 P4	93.9	—	9.9	10.4					D8365 P4	99.0	82.6 / 18.5	10.6	10.7	22.8						
D9237 P14	96.0	24.1 / 19.8	10.7	11.1	25.0				D7513 P4	96.7	24.2 / 19.6	10.1	10.4	24.9						
D1264 P14	96.6	— / 18.4	10.3	10.6					D7758 P4	97.1	23.7 / 19.5	10.5	10.7	24.4						
F5316 P14	94.0	—	10.0	10.6					D8923 P3	92.6	22.0 / 18.0	9.7	10.4	24.2						
D8538 P3	90.8	21.2 / 16.8	9.0	9.9	23.3				E299 P13	98.2	24.2 / 20.0	11.2	11.4	24.6						
C9063	97.4	22.6 / 18.9	9.8	10.0	23.1				D9762 P2	90.7	23.3 / 19.0	10.6	11.6	25.7						
C1991	92.3	23.2 / 18.9	10.8	11.7	25.1				D8973 P3	92.4	23.7 / 18.8	10.3	11.1	25.4						
D8707 P3	94.5	23.5 / 19.4	9.8	10.3	24.8				E49 P13	95.4	23.9 / 20.1	10.6	11.1	25.1						
F1845 P3	92.2	22.3 / 18.4	9.9	10.7	24.3				D8620 P3	94.8	22.4 / 18.3	10.2	10.7	23.6						
C8971	94.3	24.1 / 19.6	10.6	11.2	25.4				D7351 P4	96.8	22.2 / 18.5	10.4	10.7	22.9						
C7525	96.2	23.1 / 19.3	9.5	9.8	24.0				D7453 P4	96.0	23.0 / 18.5	10.4	10.8	23.9						
E6781 P4	97.6	—	10.3	10.5					D7835 P4	92.0	21.9 / 18.0	9.9	10.7	23.8						
D9241 P14	102.2	24.8a / 20.3a	11.0	10.8					D7745 P4	91.6	22.9 / 18.6	10.3	11.2	25.0						
B8475	95.7	22.7 / 19.2	10.5	10.9	23.6				D9189 P16	94.7	24.0 / 20.1	10.2	10.7	25.3						
D9910 P60	92.8	22.9 / 18.0	10.9	11.7	24.7				D7115 P4	92.7	22.4 / 18.8	9.6	10.3	24.1						
D7984 P4	99.4	24.3 / 19.4	11.2	11.2	24.4				D8552 P3	93.2	—	10.4	11.1	—						
E128 P13	96.4	23.3 / 19.3	10.6	10.9	24.3				E115 P13	98.4	— / 19.2	10.2	10.3	—						
D7940 P4	95.7	22.9 / 18.4	10.0	10.4	23.9				D8364 P4	93.0	22.6 / 19.1	10.2	10.9	24.3						
C409	94.3	22.3 / 18.3	9.2	9.7	23.7				D8541 P3	91.1	22.8 / 18.2	9.9	10.8	24.3						
	1852 96		1941 9	2024 10	3394 14					1798 7 4		1953 8	2056 9	4148						
													2024 / 4080	18						

38) 1824 / 1796 4 / 36190 (95.2 — 90 — 99 — 90

38) 1941 / 1953 / 38) 3894 (10.2

38) 4080 (107.4 — 38 — 280

38) 408.0 (10.8 — 38 — 280

1334 / 5799 / 7542 — 24.2

1465 / 4334 / 4146 / 3396 / 13341 (23.7 — 11.2 / 214 / 168 / 46.1

3396 / 4146 / 7542 / 62 / 134

Length

1720.8
555.0
190.7
2566.5
3619.0

65) 6185 (95.1
585
335
325
103

Shaft B.

188.4
73.6
21.0
283.0
389.4

65) 6724 (10.3
65
224

90
19.7.7
78.5
21.9
2981
408.0

65) 7061 (10.8
65
561
520

Totals

27
38

11, 10.67

11
27) 298.1
27
28.0

Coragyps occidentalis vs c. atratus

ULNA

		RLB (30)	(2) Conkling	(4) C. atratus		(20) San Josecito	(1) Carpinteno	(1) Dark Canyon
Greatest length to olecranon	max.	179.3	176.8	161.5		170.1	178.9	
	mean	166.1		155.9		163.0		
	min.	156.3	~~160.1~~	144.3		155.1		
Breadth proximal cotylae	max.	18.1	18.0	17.0	18.7	17.8		
	mean	17.0	(2)	15.8	18.0 (2)	16.5	18.1	
	min.	16.0	17.8	~~15.6~~ 14.2		15.5		
Breadth shaft in middle transversely	max.	9.4	9.2	8.2	9.5	9.1	9.8	
	mean	8.5	8.7 (5)	7.7		8.3		8.4
	min.	~~8.1~~ 7.7	8.3	7.2		7.7		
~~Depth shaft same place~~								
	max.	9.1	~~9.3~~	8.5				
	mean	8.5		8.0				
	min.	7.9	~~8.1~~	7.5				

Ratio
br sh

5.4	4.9	5.6	
5.0	4.7	5.2	
4.5	4.4	4.6	

Length mean max min

~~less than 170~~ less than 170 ~~less than 170~~ 170

70 90 over all.
20 | 140

6 — 14 over 5.0

Ratio

4.5	4.6–4.9	5.0–5.4	5.5–5.6	5.7–
max 20	III	IIII IIII	III	
		IIII		
1	IIII	IIII IIII		1
	II	IIII IIII II		

RLB 30

Re 1 11 1

71
1058

V meas before at 180.0
X " "
Ulna
RHB Coragyps

Thumb

nitford tool variable placement

10.3.67

	gr length tolerance	length to int cotyla to int dist end	Br prox int side flat on calipers	Transv br sh middle lat pap	Br dist sh caudal tub ext side flat on calipers	Depth sh same place	Br dist trochl palmar side	Ratio Brsh / length		gr ext length	int length	Br prox	Br sh mid	Br dist	Depth sh	Br dist trochl	Ratio Brsh / gr length
D8300 P4	156.3	144.9	17.6	8.3	12.8	8.3	9.7	5.3		D8503 P3	164.3	151.4	17.2	9.0	13.6	9.0	9.5	5.8
D7165 P4	179.3	168.8	18.0	9.0	13.8	9.0	10.2	4.9		D9763 P2	170.0	157.8	—	8.6	12.7	8.9	9.7	5.0
D9428 P16	173.8	159.4	18.1	9.4	13.4	9.1	10.3	5.4		D7969 P4	162.7	155.9	17.9	8.4	12.9	8.9	8.9	5.1
D7029 P4	161.5	150.4	—	8.5	12.7	8.3	9.4	5.2		D8502 P3	163.2	151.4	16.7	8.1	13.2	8.1	9.5	4.9
D8495 P3	160.2	148.3	17.2	8.5	12.5	8.7	9.8	5.3		D7520 P4	168.2	157.2	—	8.3	—	8.6	—	4.9
D8070 P4	162.9	150.9	17.5	8.6	13.2	8.6	9.6	5.3		D8282 P4	169.0	158.4	16.4	8.2	12.5	8.2	9.6	4.8
~~D9880 P4~~	~~169.1~~	~~158.7~~									~~168.6~~	~~—~~	~~—~~					
D7582 P4	163.8	152.3	—	8.1	13.5	8.3	9.7	4.9		D9669 P16	175.6	162.5	17.2	8.7	13.2	8.2	9.4	4.9
D7919 P4	167.7	156.4	—	8.5	12.9	8.6	9.4	5.0		D9051 P3	159.0	148.8	16.9	8.3	12.3	8.4	9.2	5.2
D7511 P4	165.0	153.0	18.5	8.5	13.6	8.3	10.2	5.1		J9231 P3cow	156.8	146.3	16.1	8.3	—	8.3	—	5.3
J9288 nodata	164.6	152.7	17.0	8.8	12.7	8.9	9.5	5.3		D9867 P60	161.8	149.5	16.0	8.3	—	8.0	—	5.1
D9121 P4	171.0	160.0	17.8	8.6	13.8	8.7	10.0	5.0		D7132 P4	160.5	148.5	16.9	8.4	12.6	8.4	9.3	5.3
D7736 P4	168.0	155.6	17.3	9.7	12.8	7.9	9.8	4.5	M	166.1	154.1		147.3	93.0		93.0		54.9
F1841 P3	171.5	160.0	17.2	9.1	13.5	8.6	10.3	5.3				M 17.0		M=8.5				97.1
D7314 P4	163.7	152.0	17.3	8.7	12.9	8.9	10.2	5.3	Recent	136.0	144.3	134.7	14.2	7.2	10.9	9.5	8.8	4.9
D8026 P4	167.9	157.3	—	8.4	13.2	8.3	9.2	5.3		228	160.6	149.4	16.6	7.6	12.1	7.9	9.5	5.0
D8403 P4	169.7	158.3	17.5	8.8	13.6	8.9	9.4	5.1		1739	161.5	149.3	17.0	8.2	13.0	8.3	9.2	5.4
D7449 P4	169.0	157.6	17.6	8.6	13.1	8.7	9.6	5.0		716	157.5	146.3	15.6	8.0	12.1	8.2	8.7	5.9
E192 P3	170.5	158.4	—	8.1	12.7	8.5	10.2	4.7			4 6237 155.9		4 6234 155.8	310 77		321 80		
D9758 P2	161.5	149.5	16.8	8.5	12.6	8.5	10.3	5.2	calliste		174.5	165.5	17.4	8.7	14.3	9.4	10.8	
	3167.5		245.3	162.8		163.3		97.8										

RLB addit. ulnas

30
28

11.10.67

	lgth to olecranon	to front of groove	to middle	Ratio sh				lgth	fron	sh	Ratio sh							
P4 D7192	168.0	17.6	8.2	4.8				D P3 8641	162.0	—	8.3	5.1						
P4 F917	170.9	18.2	8.7	5.1				P4 D7132	160.2	16.9	8.7	5.4						
P113 E149	167.3	—	8.7	5.2				J9258	164.4	17.0	8.5	5.1						
P7 D9738	169.2	18.1	8.8	5.1				P3 D8532	160.6	16.9	8.4	5.2						
P2 D9754	165.0	17.1	8.2	4.9				P4 D7766	165.1	18.2	8.5	5.1						
P4 D8069	164.2	—	8.0	4.8				P3 D9021	167.5	18.0	9.1	5.4						
P4 D7250	168.5	—	8.3	4.9				P4 D8312	168.1	15.1	9.0	5.3						
P4 D8077	174.0	18.0	8.4	4.8				P D9958	161.8	16.8	8.6	5.3						
P4 D7196	171.2	17.3	9.0	5.2				P3 J9281	159.9	16.5	8.5	5.2						
P4 D7902	168.2	18.2	8.6	5.1				P4 D8263	169.1	16.8	8.6	5.0						
P4 D8281	164.2	17.9	8.2	5.0					1638.7	1552	85.9	52.1						
P60 D9862	162.0	16.2	8.2	5.0					30229	22855	152.3	85.8						
P3 D8500	167.7	17.6	8.3	4.9					46416	3837	238.2	137.9						
P3 D8723	168.2	17.4	8.3	4.9														
P4 D7620	165.9	17.7	8.5	5.1														
P4 D8028	168.9	—	8.4	4.9														
P3 F1841	171.2	17.2	9.0	5.2														
P4 D8026	168.3	—	8.5	5.0														
	12 105/ 80229	9 45/ 22855	152.3	85.8														

Totals 11.10.67

	Lusth	Index	Sh	Ratio Sh
28	4661,6	(22) 383,7	(28) 238,2	(28) 137,9
(11)	1816,1	(9) 147,3	(11) 93,0	(30) 152,0
(19)	3167,5	(14) 245,3	(19) 162,7	
58	9645,2	(55) 776,3	(58) 493,9	(52) 289,9
M	166,2	14,1	8,5	5,0

```
      166.2
   58)9645,2.
      58
      384
      348
      369
      348
       172
       116
        56
```

```
      14,1
   55)776,3
      55
      226
      220
        63
```

```
      8,5
   58)493,9
      464
      299
      290
```

```
      4,99
   58)289,9
      232
       579
       522
        57
```

Ratios for Hargrave modern specimens Craspedhs atratus
H857 (Arizona)
H1012 (Mexico)

	H857	H1012
Length tibia to humerus	104.2%	101.9
Tibia to ulna	98.4%	89.3
Tarsus to humerus	61.8%	62.0%
Tarsus to femur (ext	99.9	100.0
Tarsus to carpus	115.7	113.0
Tarsus, to coracoid	143.8	142

Revised comparison C. oc. & C. catatus

11.11.67

	Total #	above mean no.	%	above max no.	%	above min no.	%
Coracoid							
length	70	70	100%	69	98%	70	100%
Br.	70	70	100%	68	97%	70	100%
%	70	55	78%	33	47%	69	98%
Humerus Br. dist.	52	52	100%	52	100%	52	100%
Tb. prox. + dist.						52	100%
Br. sh.	52	52	100%	52	100%	52	100%
% prox	52	51	98%	17	33%	51	98%
% dist	52	46	88%	27	52	52	100%
% sh	52	42	80%	6	11½%		
Ulna							
length	58	58	100%	49	84%	58	100%
Br. prox	45	45	100%	30	64%	45	100%
Br. sh.	58	57	98%	48	82%	58	100%
sh %	58	56	96%	42	72%	58	100
Carpometa.							
length	65	64	98%	61	94%	65	100%
M2 br.	65	63	97%	57	87%	65	100%
Br M2 %	65	39	60%	31	47%	46	70%
Femur							
length	65	65	100%	65	100%	65	100%
br. dist.	61	61	"	61	"	61	"
" sh.	65	64	98%	62	95%	65	100
" " %	65	40	61	26	40	58	89
dist %	55	33	60	31	56%	58	100%
Tibia length	65	54	83%	35	54%	65	100%
br. dist.	63	63	100%	63	100%	63	100%
br. sh.	60	59	98%	57	95%	60	100%
% dist.	63	63	100%	55	87%	63	100%
% sh.	60	53	88%	48	80%	57	95%
Tarsus length	65	30	46	6	9%	65	100%
Prox.	60	60	100%	60	100%	60	100%
dist.	65	65	100%	20	30%	65	100%
Sh.	65	65	100	54	83	65	100
% prox.	60	60	100	52	86	60	100
% dist.	63	63	100	54	87	63	100
% sh.	65	65	100	58	89	65	100

all 100%

Oct 1967 # of Specimens of each element of C. oc. RLB

① above mean of C. atratus in length

② " " " " " " br of shaft.

③ " min

	Total #	above mean	%	above max	%	above min	%
Femur							
Length 63		~~26~~	41%	5	~~8%~~	63	100%
Br. Sh 63		63	100%	53	84.%	63	100%
Coracoid		76		69		~~70~~	100%
Length ~~71~~ 70		~~71~~	100%	~~70~~	100% x	~~71~~	
Br. tricoracoid		~~71~~ 70	100%	~~69~~	97% x	70	100%
Humerus 3						50	100%
Length 50		50	100%	50	100%	49	98%
br sh		50	100%	50	100%		
Ulna 2					90%	30	100%
Length 30		30	100%	27	~~89~~	30	100
Br. Sh		29	97	25	83		
Carpometa						33	100%
Length 33		32	97% x	30	91%	33	100%
Br Sh M2		32	97% x	28	93%		
Femur						25	100%
Length 25		25	100%	25	100%	25	100
Br Sh		25	100	25	100		
Tibia						37	100%
Length 37		31	83%	21	56%		
Br Sh 35		34	97	32	91%	100	%

x 2 separate specimens

(figures in parentheses indicate number of specimens measured for length)

Tibiotarsi of Coragyps occidentalis

		C. atratus (6)		R.L.B. (37)	Conkling Cavern (1)	San Josecito Cave (18)
Length from proximal articular surface to distal end	max.	146.1		153.8		143.9
	mean	140.3		145.5	149.0	140.2
	min.	133.2		138.0		130.5 (~~or 137.6~~)
Breadth distal condyles measured on atnerior side	max.	13.2	15.7	15.9		14.1
	mean	12.7	14.6M	14.9	~~14.0~~	13.5
	min.	12.4	14.1	13.4		12.5 (~~or 13.3~~)
Least breadth shaft	max.	8.1	10.0	10.2	9.6	9.8
	mean	7.8	9.0 (3)	9.0	9.0 (3)	8.7
	min.	7.5	8.8	7.8	8.3	7.5 (~~or 8.0~~)
Ratio distal breadth to length	max.	9.4		10.3		10.1
	mean	9.1		9.9	9.4	9.6
	min.	8.8		9.2		9.1
Ratio breadth shaft to length	max.	5.8		6.8		7.3
	mean	5.7		6.0	6.0	6.8
	min.	5.6		5.4		5.7

Ratio	5.0 - 5.4	5.5 - 5.9	6.0 - 6.4	6.5 - 6.9	7.0 - 7.5
		6	11		
		1111	1111	1111	111
RLB	1	11	12	111	
21					

(= atratus)

TIBIOTARSUS C. occidentalis and C. atratus

Ratios to length

RLB	Length to prox. articular surface	Breadth distal end	Br. prox.	Br / th	Dist.	th / th
D9310 max. length (omit if disturb where signif.)	153.0	14.1			9.2%	
D7570 min. length	138.2	13.6			9.8	
Max. of each 37 meas. series ~~20~~	153.8 (146.1) atratus	15.8 (13.2) atratus	(16.3) 19.1	10.2 (8.1)	10.3 ~~11.1~~ (9.4)	6.8
mean of each 37 in series of ~~20~~	145.8 (140.3)	14.9 (12.7)	(15.7) 18.0	9.0 (7.8)	9.9 (9.1)	6.0
min. of each 37 in series of ~~20~~	138.0 (133.2)	13.4 (12.4)	(14.7) 16.9	7.8 (7.5)	9.2 (8.8)	5.4
RECENT						
C. atratus LACM 228 (~~max~~. ~~xxxxxx~~	146.1 (max)	12.9 (specimen is atratus max is 13.2)	16.3 max	8.1	8.8 min ratio	5.8 max
LACM 1360 (min) length	133.2 (min)	12.4 (min)	14.7 (min)	7.8 7.5	9.2	5.7 mean 5.6 min
Mean of 6	140.3	12.7	15.7	(4)	9.4 9.8	
~~1965 meas~~ ~~146.8~~ 149.0		14.0	20.4	9.0	1967 meas ratio 6.0%	
San Jose atratus 18 length (140.4) (137.6)	143.9 140.2 130.5	14.1 13.5 (13.3) 12.5+	17.9 17.1 16.5	9.8 8.7 7.5 (8.0)	10.1% 9.6% 9.1	7.3 6.2 5.7

R L B C. oc. tibiae

	Length to artic	Br px	Br dist auth across condyles	Depth ext cond	Depth int cond	Br dist at level	Ratio br to length	Ratio dist length
+160 other ones 145.5								
D8334 P4	138.7	18.2	14.4	13.8	14.9	8.8	6.3	10.3
C8433 D7230 P4	148.8	17.1	13.9	13.3	14.7	8.6	5.7	9.3
D7375 P4	(138.0)	—	(13.4)	13.7	14.0	(9.8)	5.6	9.7
E7329 P17	(138)	—	(15.9)	—	15.6	9.25	5.9	10.3
D7415 P4	139.4	17.2	14.4	13.8	14.9	8.6	6.1	10.3
D8488 P3	141.1	17.6	13.8	13.8	14.9	9.4	6.1	9.7
D8001 P4	147.8	—	15.2			10.2	(6.8)	10.2
D7948 P4	146.8	18.2	15.4			9.2	6.2	10.5
D9085 P3	139.9	(16.9)	(13.4)			8.9	6.3	9.6
D8327 P4	142.0	17.8	14.5			8.8	6.2	10.2
D8261 P4	147.1	18.2	14.5			9.3	6.2	9.8
D9555 P16	146.3	—	15.3			8.0	(5.4)	10.4
D8066 P4	146.9	—	14.2			9.8	6.6	9.7
D8125 P4	150.5	18.8	14.1			9.2	6.0	9.3
D8652 P3	145.7	18.3	14.9			8.7	5.9	10.2
D8507 P3	144.5	18.3	14.9			9.3	6.4	10.3
D8528 P3	144.0	18.8	15.5			9.8	6.7	10.7
D7441 P4	145.1	—	14.6			8.5	5.8	10.0
D9120 P3	147.5	18.0	14.8			8.5	5.7	10.0
D7455 P4	147.7	17.4	(13.6)			8.5	5.7	9.2
D7879 P4	146.5	18.2	14.5			9.0	6.1	9.8

Additional equivalent from overlap paper

	Length to artic	dist	px	Length to shaft	Ratio dist	ratio sh	P4
D9160	146.7	14.3	—	8.5	9.7	5.8	3
D9744	151.8	14.8	19.0	8.8	9.5	5.8	2
D7440	147.0	13.7	—	8.6	9.3	5.8	4
E577	148.3	15.1	18.7	9.4	10.1	6.3	3
D7417	142.4	14.3	18.0	9.4	9.6	6.3	4
D8822	148.8	14.3	—	9.3	9.6	6.2	3
D7717	141.6	14.7	17.8	8.8	10.3	6.2	4
D7570	138.2	13.6	—	9.0	9.8	6.5	4
D9564	138.2	14.8	—	—	10.6	→	16
D7036	144.0	14.3	—	—	9.9	—	4
D7473	147.4	14.1	17.4	8.1	9.5	5.5	4
F1840	140.7	15.4	—	9.4	10.9	6.6	3
D7568	143.7	13.7	—	8.3	9.5	5.7	4
D7465	147.4	15.0	19.1	9.6	10.1	6.5	4
D9268	152.2	15.7	—	10.0	10.3	6.5	16
D9310	153.0	14.1	18.1a	9.9	9.2	6.0	16
D9263	142.4	14.5			9.8		16
Dup D8066	146.5	14.1			9.6		4
D8571	143.3	14.2			9.9		3
D8834	138.7	14.5			10.4	—	3
	8/102	8/47		11/128	11/180	79/2	

RLB

Additional Tibiae

11. 10.67

D7037 – 8418 = Pit 4

D8439 – 9185 = Pit 3

D9186 – 9723 = Pit 16

D9725 – D9812 = Pit 2

D9813 – 9821 – Pit 1

D9822 – 9916 – Pit 60

D9917 – E35 = Pit 77

E36 – E338 = Pit 13

	Length to nut artic.	Dist to ant'h	Least br sh	Ratio dist	Ratio sh																
D7037 P4	143.9	—	9.0	—	6.7																
D7564 P4	144.3	14.0	8.6	9.7	5.9																
F7441 P91	145.8	—	8.5	—	5.8																
D7877 P4	146.9	14.4	8.9	9.8	6.0																
D8616 P3	146.6	13.8	8.8	9.4	6.0																
D8064 P4	138.5	13.8	8.7	9.9	6.2																
D8278 P4	143.2	13.9	8.8	9.7	6.1																
F7270 P4	147.9	15.0	9.5	10.1	6.4																
D9110 P3	149.8	14.9	9.1	9.9	6.0																
D9555 P16	146.5	14.9	8.7	10.1	5.9																
F7269 P4	147.6	13.6	9.0	9.2	6.1																
E577 P3	148.1	14.9	9.2	10.0	6.2																
D8165 P4	154.7	15.4	9.4	9.9	6.0																
D8499 P3	142.6	14.5	8.8	10.1	6.1																
D7350 P4	146.2	13.9	8.9	9.5	6.0																
D9668 P16	150.2	14.6	9.4	9.7	6.2																
D7479 P4	139.1	13.7	9.1	9.8	6.5																
D9942 P77	152.4	14.5	9.6	9.5	6.3																
E524 P13	142.6	14.3	8.9	10.0	6.2																
	8.09 9 7 6 9	2 4 10 1	1 7 0 9	11 6 8 3	11 6 5 6																

11.10.67 Length ~~dust~~ sh. Ratio dust sh

(23)

Totals

(25)	3642.4	23	329.8	25	225.3	13	225.4	25	154.2
(21)	3048.1	(21)	305.2	21	188.1	21	209.0	21	127.7
(19)	2764.2	(19)	274.7	(14)	128.1	(19)	178.0	(14)	85.7
65	9454.7	63	909.7	(60)	5415	69	612.4	(60)	367.6
M	145.4		14.4		9.0		9.7		6.1

11.10.67

145.4
65)9454.7
65
295
260
354
325
297
260

14.4
63)909.7
63
279
252
27

90
60)5415
540
15

9.7
63)612.4
567
454
441

6.1
60)367.6
360
76

Carpometacarpi of Coragyps occidentalis

(figures in parentheses indicate number of specimens on which measurement of length was taken; breadth measurements were not possible on all of these

		C. atratus (4)	R.L.B. (33)	Conkling Cavern (1)	Hachita Cave	San Josecito Cave (21)
Greatest length	max.	78.2	87.6	84.5		81.2
	mean	74.9	81.6			76.9
	min.	67.5	74.1			74.1
Breadth proximal trochlea	Max.	19.3	10.7	10.8		9.8
	mean	8.6	9.6		10.3	9.2
	min.	8.3	9.1	10.1		8.9
Breadth shaft M 2	max.	7.7	9.1	8.7		9.3
	mean	7.4	8.1	8.5		8.3
	min.	6.7	7.3	8.4		7.6
Ratio breadth M2 to length	max.	10.0	11.0			11.5
	mean	9.8	9.9	10.0		10.7
	min.	9.7	9.1			9.4

Ratio br. to lgth: 12.2 / 10.8; 13.2; 11.3

Means of length 6% shorter max 4% min equaled by 1 specimen

20

Ratio shaft M2 #

9.1-9.3	9.4-9.6	9.8-9.9	10, 10+	10.6=10.9	11.0 11.1-11.9
1	1		IIII	IIII III	IIII IIII

RLB

1	IIII IIII	IIII	IIII IIII	IIII
			11	

(figures in parentheses indicate number of specimens on which measurement of length was taken; on some of these the breadth measurements could not be taken) Carpometacarpi of Coragyps occidentalis

		RLB (33)
Greatest length	max.	87.6
	mean	81.6
	min.	74.1
Breadth trochlea (prox.)	max.	10.7
	mean	9.6
	min.	

(= C. atratus)

Carpometacarpus C. occidentalis vs. C. atratus

	Ext. length to dist. end M2	Breadth trochlea	Depth thru M1	Breadth shaft M2	Ratios trochlea / depth M1	Ratios shaft / depth M1	Ratios shaft / trochlea
RLB							
Specimen of max. length							
D9267	86.8	10.7	22.3	8.7	12.3	25.6	10.0
~~D7484~~	~~86.8~~	~~10.0~~	~~21.4~~	~~8.7~~			
D9941	87.6	9.9	22.2	8.0	11.3	25.3	9.1
Specimens of minimum length							
E4043	74.1	9.8	20.2	8.1	13.2	27.2	10.9
D7942	75.3	...	...	7.8			10.3
Maximum measurements of 33 specimens	87.6 (78.2)	10.7 (9.3)	22.7 (21.0)	9.1 (7.7)	13.2 (12.2)		11.0 (10.0
Mean measurements of 33 specimens	81.6 (74.9)	9.6 (8.6)	20.7 (19.7)	8.1 (7.4)	11.7 (11.4)		9.9 (9.8
Minimum measurements of 33 specimens	74.1 (67.5)	9.1 (8.3)	19.5 (18.0)	7.3 (6.7)	11.3 (10.8)		9.1 (9.7
RECENT							
C. atratus							
Max. ~~length~~ all meas. LACM 1739	78.2	9.3	21.0 max	7.7	12.2	26.7	10.0
Min. ~~length~~ all meas. LACM 1360	67.5	8.3	18.0 min	6.7	11.4	26.3	9.8
~~Average of~~ 4	74.9 Mean = min. of RLB	8.6	19.7 Mean	7.4	10.8	25.7	9.7
Hachita Cave		10.4	13.5 ext depth	7.			
Conkling #59	84.5	10.8	21.8	8.5			
#45		10.1	21.5	8.5			
San Isidro	81.2	9.8	21.3	9.3			
	76.9	9.2		8.3			
Flesh	74.1	7.8	18.8	7.6			
		18.8 %					

Sept 1967 Carapus laBea

33 Bones

Carphonebacaulus

	(20) Ext. length to M2 dith	(20) Br troch	(20) Depth thru M1 prom	(20) Br sh M2 mid	troch (20)	Ratio to length Depth thru M1	Ratio to length Br M2		(13) Ext length to M2	Br troch (12)	(12) Depth thru M1	(13) Br sh M2 mid	troch	Ratio to length Depth thru M1	Ratio to length Br M2
E441 P61	81.7	9.8	22.0	7.8	11.0		9.5	D7516 P4	79.8	9.1 X	20.0 X	8.5	11.3		10.6
D2263 P4	80.7	9.3 X	21.5	8.2	11.5		10.1	D8868 P3	82.4	10.0	21.3	8.2	12.1		9.9
H2048 P81	83.1	9.2 X	22.6	8.2	11.0		9.8	E352 P61	79.7	9.4	20.9 X	7.8 X	11.8		9.1
E6749 P4	81.8	9.4	21.4	8.3	11.4		10.1	D9197 P16	80.5	9.8	22.2	8.7	12.1		10.8
D9267 P16	86.8	10.7	22.3	8.7	12.3		10.0	D8580 P3	79.4	9.4	19.9 X	7.5 X	11.8		9.4
D8418 P4	81.0	9.6	22.0	8.0	11.8		9.8	D7785 P4	81.8	9.6	21.9	8.6	11.7		10.5
D7863 P4	80.3	9.2 X	20.1 X	7.7 X	11.7		9.5	D7484 P4	86.8	10.0	21.4	8.7	11.5		10.0
D8211 P4	80.8	9.8	20.9 X	7.8	12.1		9.6	H2051 P91	82.2	10.1	21.8	9.1	12.2		11.0
D8876 P3	84.4	10.2	22.0	8.1	12.0		9.6	D7942 P4	75.3 X	—	—	7.8	—		10.3
E4043 P4	74.1 X	9.8	20.2 X	8.1	13.2		10.9	D9941 P77	87.6	9.9	22.2	8.0	11.3		9.1
E256 P13	79.0	9.3 X	20.8 X	7.8	10.7		9.8	D9858 P60	81.2	9.5	21.1	8.0	11.7		9.8
D7607 P4	85.1	10.5	22.7	8.4	12.8		9.8	D9853 P60	77.8 X	9.3 X	21.0 X	7.5 X	11.9		9.6
E57 P13	84.5	10.3	21.9	8.7	12.2		10.3	D8991 P3	80.0	9.5	19.8 X	8.1	11.8		10.1
E61 P13	85.9	10.3	22.5	8.6	12.0		10.0		10545	11856	2543	1060	1412		1306
E444 P61	79.6	9.2 X	20.8 X	7.7 X	11.5		9.6		16383	19510	4287	1633	2355		1982
D8496 P3	81.9	9.6	21.5	8.4	11.7		10.2		16928	31063	36822	26958	33765		3288
D7242 P4	83.9	9.6	21.3	7.9	11.4		9.4		264	269	66	264	32		297
D9042 P3	82.6	9.2 X	21.7	8.3	11.1		10.0		5328	210	222	53	245		312
D9731 P2	81.0	10.0	21.0 X	8.3	12.3		10.2		33		10.7	8.1	11.7		9.9
B3428 P3 cav	80.1	10.0	19.5 X	8.3	12.4		10.3		198	9.6					
	16383	1958	4287	1633	2355		1982								

81.4

C. occidentalis La Brea Sept 1967

Turiela
↳ caliche flat
part- aut bg
peat,

	Br	Depth	Nt Symph,	Gr Depth sh.	Depth Symph
F2050	66.2	56.3	9.7ap	4.1	6.5
D9791	66.6	54.8	10.5	4.3	5.6
D7148	64.5	56.7	10.3ap	3.9	5.2
D8626	iii	58.?	11.7	4.4	6.1
D7780	—	—	12.7	4.7	7.0
D8095	—	55.7?	9.3ap	4.3	6.0
D8015	—	55.5	10.4	4.1	5.7
E478	—	57.9	11.0	4.5	6.3
D8417	—	53.9	10.6	4.1	6.5
E522	—	55.2	10.5	4.1	5.2
D7637	—	56.4	11.3	4.0	5.8
J6489	—	57.5	10.3	4.0	5.3
E410	—	57.9	10.3	4.1	5.2

Addw carfi RLB 10.10.67

33

32

	Length of duck antler	Beam across	Beam sq mm	Ratio sq mm / length				Length of duck antler	Total beam	Beam sq mm	Ratio sq mm / length
C5721	79.6	9.6	7.8	9.8			P4 D7360	80.7	10.1	8.4	10.4
P4 D8180	82.7	9.8	8.5	10.2			P3 D9317	83.1	9.9	8.2	9.8
P61 E375	79.7	9.4	8.0	10.0			P3 D9135	83.3	—	8.8	10.5
P61 E431	83.3	9.3	8.4	10.1			P4 D7044	81.9	9.6	7.9	9.6
P4 D7484	86.6	10.1	8.8	10.1			P13 F61	85.8	—	8.5	9.9
P4 D7433	82.6	10.0	8.6	10.6			P3 D8836	84.5	10.6	9.1	10.7
P3 D8839	81.5	9.3	7.9	9.7			P13 E57	84.7	9.9	8.9	10.5
P4 D8181	84.7	9.8	8.7	10.2			P60 D9853	77.9	9.3	7.6	9.7
P4 D7765	81.9	9.6	8.6	10.5			P4 D7673	80.2	9.1	7.4	9.2
P4 D7380	82.8	9.3	8.3	10.0			P3 D8876	84.2	9.8	8.2	9.7
P60 D9846	79.7	10.1	8.2	10.2			P61 E349	82.7	—	8.4	10.1
P13 E279	79.4	9.7	8.4	10.5			P4 D7267	81.4	9.6	8.3	10.2
P16 D9244	82.9	9.8	8.0	9.6				99.6	87.9	99.7	120.3
P16 D9514	81.9	—	7.9	9.6				1638.9	155.3	164.3	201.2
P4 D7498	81.7	9.5	8.0	9.7			26292	243.2	264.0	321.5	
P4 D7248	85.2	—	8.6	10.1							
P67 E453	79.2	9.7	8.1	10.2							
P3 D8510	83.0	10.3	8.6	10.3							
P13 E197	78.9	—	7.5	9.5							
P4 D7310	81.4		8.4	10.3							
	1638.9	155.3	164.3	201.2							

Total 11,10.67

Length Track

C32	2629.2	(25) 243.2	(32) 264,0	(32) 321.5
33	2692,8	(32) 310,6	(33) 269,3	33 328,2
65	5322,0	(57) 553,8	(65) 533,3	(65) 649,7

M = 81,8

```
      81.8
   ---------
65)5'3220
   520
   ---
    122
     65
    ---
    570
    520
```

```
       9,7
   ---------
57)5538
   513
   ---
    408
    399
```

```
       82
   ---------
65)533,3
   520
   ---
    133
    130
```

```
       9,9
   ---------
65)649.7
   585
   ---
    640
```

Coragyps occidentalis and C. atratus

TARSOMETATARSUS

		RLB	McKittrick	San Jose	C. atratus	Hachita	shastensis
Greatest length	max.	88.8	90.6	83.5	86.0		
	mean	82.8	84.9 (3)	79.8	83.0 (2)		83.0
	min.	78.3	84.3	76.5	76.0		
Proximal breadth	max.	17.9	17.9	17.1	15.8		
	mean	16.9	17.2 (3)	16.0	14.9 (2)	16.4 (1)	17.4
	min.	16.0	16.8	15.3	14.3		16.0
Distal breadth	max.	18.7	18.9	17.6	17.7		
	mean	17.5	18.6 (3)	16.8	16.4 (2)		17.9
	min.	16.5	18.4	16.1	15.4		
Least breadth shaft	max.	8.6	8.6 (4)	8.5	7.4	7.7	
	mean	7.8	8.1 M	7.7	6.8 (2)	(2)	8.7
	min.	7.0	7.5 mm	6.8	6.5	6.6	
Ratio to length prox.	max.	21.8	20.8	21.6	19.1		
	M	20.1	19.4	20.1	17.7		20.9
	min	18.8	18.0	18.3	16.6		
dist	max.	22.9	21.9	22.0	20.2		
	M	21.0	21.4 mean	21.7	19.7		21.5
	min.	19.8	18.6 20.7 mm.	20.0	18.6		
shaft	max.	10.5	10.1	10.4	8.8		
	M	9.2		9.9	8.4		10.4
	min.	8.6	8.3	8.2	7.8		

★ Smith Creek Cave frag. of tarsus

Leptos mays means mus.
compare 340 lbs 270 190

Ratio Br.-Sh. Mex 20

8,0-8.4	8.5-8.9	9.0-9.4	9.5-9.9	10.0-10.4	10.5
1	III	IIII	IIII	IIII	1

RLB 61

35

(in millimeters)

Measurements of Coragyps occidentalis from Rancho La Brea Compared with Recent specimens of C. atratus

	Tarsometatarsus				Ratios to length in per cent		
RLB	Greatest length	Proximal breadth	Distal breadth	Least breadh shaft	Prox.	Dist.	Shaft
Specimens of maximum length							
~~J9768~~	88.7		17.6	8.1		19.8	9.1
D7416	88.7	16.7	17.7	8.1	18.8	19.9	9.1
~~E~~ 31	87.2	17.8	17.7	8.1	20.4	20.3	9.3
Specimens of minimum length							
D8939	78.3	16.7	17.1	7.6	21.3	21.8	9.7
D9562	79.1	17.1	17.9	8.2	21.6	22.6	8.9
D7212	79.6	17.4	18.1	8.1	21.8	22.7	10.1
D8888	79.8	16.3	16.8	7.0	20.4	21.0	8.7
D8283	78.9		16.7	7.8		21.0	9.8
Maximum measurements and ratios in series of 50	88.8 (64 out) 88.7	(86.0)	17.9	(15.8) 18.7	(17.2) 8.3	(7.4) 21.8	(19.1 out 22.9 20.2 10.3 out 10.1
Mean of measurements and ratios in series of 50	82.8 out 82.9	(83.0)	16.9 out 16.7	(14.9) 17.5 out 17.4	(16.4) 7.8 out 7.7	(6.8) 20.1 out 20.0	(17.7) 21.1 out 21.0 (19.7) 9.2 out 9.0 (8.4)
Minimum measurements and ratios in series of 50	78.3	(76.0)	16.0	(14.3) 16.5	(15.4) 7.0	(6.5) 18.8	(16.4 19.8 (18.6) 8.6 (7.8)
RECENT C. atratus							
LACM 716 (maximum length)	86.0		14.3	16.0	6.7	16.6[a]	18.6[a] 7.8[a]
LACM 1360 (minimum length)	76.0		14.5	15.4	6.7	19.1[b]	20.2[b] 8.8[b]
Average measurements and ratios in series of six	83.0		14.9[c]	16.4[d]	6.8[e]	17.7	19.7 8.4

[a] Minimum ratios are found in the specimen of maximum length

[b] Maximum ratios are found in the specimen of minimum length

[c] Maximum and minimum measurements of proximal breadth: 14.3 and 15.8 mm.

[d] Maximum and minimum measurements of distal breadth: 17.7 and 15.4 mm.

[e] Maximum and minimum measurements of least breadth of shaft: 7.4 and 6.5

Table of Measurements of Tarsometatarsus

	Length	Least breadth of shaft	Ratio breadth shaft to length
C. occidentalis D8939	78.3	8.3	

	a Length	b Least Breadth shaft	c Breadth @istal end	d Breadth Trochlea for D3	e Depth Trochlea for D3	Ratio b to a
C. occidentalis						
D8939	78.3mm.	7.6mm.	17.1mm.	6.9mm.	10.8mm.	97.0%
D8283	78.9	7.8	16.7	7.		98.8
D8236	79.1	7.1	16.1	6.7	10.4	89.7
Specimen listed by Miller (~~1910~~) 1911. p.389	83.5	7.2	17.0	7.3	10.8	86.2
J9768	88.7	8.1	17.6	7.3	11.1	9.13
C. urubu						
Coll.L.H.Miller no. 245	82.7	6.7	16.4	6.2	10.9	81.0
no. 731	83.5	7.5	16.8	6.6	9.8	89.8
Coll.L.A.M. no. 228	85.0	6.9	16.3	6.5	10.5	81.1
Specimen from Conkling Cave no. 74	78.3?	7.3	15.5	6.5	10.5	93.2?
C. shastensis Smith Creek Cave	83.0	8.7 7.8—	17.9 17.8	7.3 7.2	10.6	10.48

789)1670 (21.0
1578
920
789
1310

791)1610 (203
1582
2800

	C.M.	C.M.
Total aver. length of wing	394.4	369.8
Total aver. length of leg	321.3	311.7
Ratio of wing to entire	584.2	606.2
" " leg " "	476.0	510.9
" " cor. " " wing	17.11	161.49
" " " " leg	21.00	19.57

Taurus C.oc. RLB

✓ exceed atlatus ♂ =

	Length	Means, ♂'s, pur	dist	sh	Ratios to Height pur	dist	sh
Pit 16							
D85'70	86.1 ✓	+ (17.9)	18.0	8.1	20.8	20.8	9.4
D95'10	86.0 =	17.4	18.5	8.0	20.4	21.4	9.3
D95'59	84.8	17.2	17.4 X	7.7	20.2	20.7	9.0
D9329	84.3	17.8	+ (18.7)	(8.2+)	21.1	22.2	(9.7) +
D9552	82.8	- (16.6)	- [17.0 X]	[7.7-]	- (20.0)	20.5	(8.9) -
D9562	— 79.1	17.1	17.9	(8.2+)	+ (21.6)	+ (22.6)	~~8.9~~ 10.3 ✓ other pair
	503.1	1042	107.7	47.6	124.1	128.2	54.2
	6) 503.1	6) 1042	6) 107.7		6) 124.1	6) 128.2	6) 54.2
	(83.8)	17.3	17.9	7.9	20.67	21.3	9.0
7) 588 4 84.4	7) 588 5 (84.2	18.0	18.5	8.4	20.8	21.4	9.7
Pit 13	82.7						
E 304	82.7	17.0	[17.2 X]	7.6	20.5	20.7	9.1
E 241	82.4	16.9	(18.7)	(8.1)	20.5	(22.7)	(9.8)
E 537	81.8	16.9	[17.6 X]	7.9	(20.6)	21.5	9.6
E 214	81.3	16.6	[17.3 X]	7.5	20.4	21.2	9.2
	4) 328.2	4) 67.4	4) 70.8	31.1	820	861	37.5
	82.0	16.8	17.7	7.9	20.5	21.5	9.3

Totals + averages for all pits combined

Pit 16 (6)	503.1	104.2	107.7	47.6	124.1	128.2	54.2
Pit 13 (4)	328.2	67.4	70.8	31.1	82.0	86.1	37.5
Pit 3 (12)	986.3	201.7	209.7	93.5	244.9	255.4	113.7
Pit 4 (21)	1659.0	317.7	345.2	152.8	387.8	413.5	183.8
?	+ 79.1	17.0	17.8	7.6	21.4	22.5	9.8
	43) 3555.7	42) 708.0	43) 751.2	43) 332.6	43) 860.2	43) 907.7	43) 399.0
	82.6	16.8	17.4	7.7	20.0	21.1	9.2

C.oc. (43)

M.	~~82.6~~ 82.9 (30 others)	~~16.8~~ 16.7 (49 spec.)	17.4 OK 49	7.7 OK 30	20.0 OK 49	~~21.1~~ 21.0 (50)	~~9.2~~ 9.0 (50)
Max	88.7 (4)	17.9 (16)	18.7 (13/16)	8.3 (3)	21.8 (4)	22.7 (4/13)	10.1 (4)
Min	78.3 (3)	16.0 (4)	16.5 (4)	7.0 (3/4)	18.8 (4)	19.9 (4) 19.8 (new low)	8.6 (4)
Coragyps (4) atratus							
M	83.0	14.9	16.4	6.8	17.7	19.7	8.4
max	86.0	15.8	17.7	7.4	19.1	21.0	8.9
min	76.0	14.3	15.4	6.5	16.4	18.6	7.8

Taurus C.o.

Ratio □ = damaged work

(+2 99)	Length	Prox / Length	Dist / Length	Sh Br / Length	pray	Actual meas dist	Actual meas leaf br sh.	avg 9617
Pit 3								
D8574 (8)	− 80.8	20.6	+ (21.8)	+ (9.9)	16.7	[17.7] ×	8.0	
D8718 4	+ 84.3	19.7	21.1	− (9.0)	16.6	17.8	7.7	
D8888 (11)	− [79.8]	20.4	[21.0]	[8.7] ×	− (16.3)	[16.8] ×	[7.0] ×	
D8559 (6)	82.4	20.0	21.4	9.7 +	16.6	[17.1] ×	7.6	
D8573 (10)	− 80.3	20.5	21.4	+ (9.9) +	16.5	[17.2] ×	8.0	
D9171 (1)	+ (86.6)	− (19.5)	− (20.1)	9.5 +	16.8	[17.3] ×	8.2	
D9180 (1)	− 80.4	21.0	21.7	9.3 −	17.0	[17.5] ×	7.5	
D9020 (2)	+ 85.3	20.4	21.3	9.6 +	+ (17.4)	18.2	8.2	
D8939	− (78.3)	+ (21.3)	+ (21.8)	9.7 +	16.7	[17.1] ×	7.6	
D9036 (5)	+ 83.4	20.8	21.5	9.4	+ (17.4)	18.0	7.9	
D8524 (7)	− 81.0	20.3	21.3	9.2 −	16.5	[17.3] ×	7.5	
D8975 (3)	+ 84.3	20.4	[21.0]	9.8 +	17.2	[17.7] ×	8.3	
	12)936.3	244.9	255.4	113.7	12)208.5	12)209.7	12)93.5	
	82.2	20.4	21.3	9.4	16.9	17.4	7.8	
Pit 4 (+2 99)								
D7471	80.0	21.1	[20.1]	9.3	16.8	[16.1] ×	7.5	
D9719 15	81.2	20.6	20.9	9.8 +	17.2	[17.0] ×	8.0	
D7696 (2)	+ 85.4	20.1	20.6	9.0	17.7	[17.6] ×	7.7	
D8160 (3)	+ 85.6	20.8	21.6	9.6 +	17.4	18.0	8.2	
D7163 (8)	+ 84.1	20.6	21.6	[8.9]	16.4	17.8	7.5	
D8463 (14)	81.4	20.4	21.0	9.3 —	16.3	[17.1] ×	7.6	
D7293 18	80.3	20.2	20.9	9.2 —	16.9	[16.8] ×	[7.4] ×	
D7405 17	81.4	~~20.7~~ 19.2	~~21.3~~ 20.4	9.3 —	16.3	[17.4] ×	7.5	
D7834 6	+ 84.6					[17.3] ×	7.9	
D7194 5	+ 84.7	[18.9?]	20.0	[8.8] —	(16.0)	[17.0] ×	[7.2] ×	
D8000	82.4	19.7	20.6	8.9 —	16.3	[17.0] ×	[7.4] ×	
D7416 12 (13)	+ (88.7) ✓	− [18.8]	− (19.9)	9.1 —	16.7	[17.7] ×	8.1	
D7419 (9)	84.8	19.4	20.0	[8.6] × —	16.5	[17.0] ×	[7.3] ×	
D7273 16	81.0	—	20.4	[8.6] × —	—	[16.6] ×	[7.0] ×	
D8573 17	80.3	20.5	21.4	9.9 + —	16.8	[17.2] ×	8.0	
D7621 (11)	82.8	19.3	(19.9)	[8.7] —	16.0	[16.5] ×	[7.2] ×	
D8143 (9)	+ 83.9	19.4	21.1	[8.9] —	16.4	[17.7] ×	7.5	
D7614 (5)	+ 84.5	20.1	21.3	9.4 —	17.0	[18.0]	8.0	
D7212	— (79.6)	+ (21.4)	+ (22.7)	+ (10.1) + —	17.4	18.1	8.1	
D8068 10	83.3	20.1	20.8	9.2 —	16.8	[17.3] ×	7.7	
	20)1659.8	19)387.8	20)413.8	20)183.5	19)317.9	20)345.2	20)152.8	
	82.9	20.0	20.6	9.1	16.7	17.2	7.6	

actual meas

Pt 2	Length	max dist		max dist		90% weight
D9759	86.4	17.0	17.7	7.4	19.6	20.5	8.8
D9774	81.7	16.9	17.9	7.4	20.6	21.9	9.3
	168.1	339	356	152	402	424	18.1

Pt 34

C2472	80.4	16.9	17.4	7.6	21.0	21.6	9.4

Pt 77

E31	82.2	17.8	17.7	8.1	20.4	20.3	9.3
E8	83.9	—	17.4	8.0	188	20.8	9.5
J9768	88.7	16.7	17.6	8.1		19.8	9.1
	254.8	34.5	52.7	24.2	392	60.9	
Pt 91					19.5	20.8	8.9
C2475	83.0	16.2	17.3	7.4			

Pt 61-67

E41.9	82.2	16.6	17.6	7.9	20.2	21.4	9.4
	83.2	17.2	17.8	8.4	20.4	21.4	10.1
Add E395	84.1	17.9	18.3	8.6	21.2	21.7	10.2
E489	248.5	51.7	53.7	24.9	61.8	64.5	29.9
			17.9	8.3	20.6	21.5	9.9

Pt 77

J9768	88.7	16.7	17.6	8.1	—	19.8	9.1

7)	589.6	119.1	105.6	54.3	121.3	146.3	64.4
	355.7	708.0	712	332.6	860.2	907.7	399.0
	414.53	827	856.8	386.9	981.5	1054.0	453.4
	400	49	49	50	49	50	50
	145	827	856.8	386.9	981.5	1054.0	453.4
	100	49	49	50	49	50	50
	453	16.7	17.4	7.7	20.0	21.0	9.0

4145.3
1154.1
(64) 5304 (82.8)
512
180
128
52

82.9

60 101 5' (169 63) 1103 5' (17.5 63) 501 2 (64) 1352.9 (64) 592.1 (9.2)
69 473 448 128 576
415 441 532 72 141
369 325 812 79
31 31 7.8 21.1

longer (or as long as) fatter

ratios (2 as narrow (pwr.) none by actual meas
6 " " (disk) 35 " " "
16 " " (shaft) 9 " " "

1659
980
264

Taurus

Tarsus L. vs. RLB Lacm

Pt 3 in order of length		Breadth prox	Breadth dist	length shaft	Ratios to length 90 prox	Ratios to length 90 dist	82 90
	86.0	16.8	17.3	8.2	19.5 −	20.1 +	9.5
	85.3	17.4 +	18.2 +	8.2	20.4	21.3	9.6
	84.3	17.2 +	17.7	8.3 +	20.4	21.0	9.8
Qual 1963	84.3	− 16.6	17.8	7.7	19.7	21.1	9.0
	83.8	17.4 +	18.0	7.9	20.8	21.5	9.4
	82.4	− 16.6	17.1	7.6	20.0	21.4	9.7
	81.0	− 16.5	17.3	7.5	20.3	21.3	9.2
	80.8	− 16.7	17.7	8.0	20.6	21.8	9.9 +
	80.4	17.0 +	17.5	7.5	21.0	21.7	9.3
	80.3	− 16.5	17.2	8.0	20.5	21.4	9.9 +
	79.8	− 16.3 −	16.8 −	7.5 +	20.4	21.0	8.7 −
	78.3	− 16.7	17.1	7.6	21.3 +	21.8 +	9.7
M	82.2	16.8	17.4	7.8	20.4	21.3	9.4
Pt 4	88.7 ✓	16.7	17.7 +	8.1 +	18.8 −	19.9 −	9.1
	85.4	17.2 +	17.6 +	7.7	20.1	20.6	9.0
	85.1	17.7 +	18.0 +	8.2	20.8	21.1	9.6
	84.8	− 16.5	− 17.0	7.3	19.4	20.0	8.6 −
	84.7	− 16.0	− 17.0	7.2	18.9	20.0	8.5
	84.6	− 16.3	17.3 +	7.9	19.2	20.4	9.3
	84.5	17.0 +	18.0 +	8.0	20.1	21.3	9.4
	84.1	17.4 +	17.8 +	7.5	20.6	21.1	8.9
	83.9	− 16.4	17.7 +	7.5	19.5	21.1	8.9
	83.3	16.8	17.3	7.7	20.1	20.8	9.2
	82.8	− 16.0	− 16.5	7.2	19.3	19.9 −	8.7
	82.4	− 16.3	− 17.0	7.4	19.7	20.6	8.9
	81.4	16.9 +	17.4	7.5	20.7	21.3	9.2
	81.4	− 16.8	− 17.1	7.6	20.4	21.0	9.3
	81.2	16.8 +	− 17.0	8.0	20.6	20.9	9.8
	81.0	−	− 16.6	7.0 −	—	20.4	8.6 −
	80.3	− 16.5	17.2	8.0	20.5	21.4	9.9
	80.3	− 16.3	− 16.8	7.4	20.2	20.9	9.2
	80.0	− 16.1	− 16.9	7.5	21.1	20.1	9.3
	79.4	17.4 +	18.1 +	8.1 +	21.8 +	22.7 +	10.1 +
Added 1976	~~79.1~~	17.0	17.8	7.8	21.4	22.5	9.8
M	82.8	M 16.7 M	M 17.2 M	M 7.6	M 20.1 M	M 20.8 M	9.2

Added La Brea Tarsi

	length	post br.	dist br.	sh br.	
E48	84.1	17.9	18.3	8.6	No
J9774	no data 84.1	17.1	17.9	8.3	No
D8160	~~85.1~~	~~17.8 (7)~~	~~17.9 (18.0)~~	~~8.4 (2)~~	~~X ( ) prev. figs~~
D9880	83.0	16.7	18.0	8.4	No
D7212	~~29.2 (6)~~	~~17.4~~	~~18.2 (1)~~	~~8.3 (1)~~	~~X ( ) prev. figs~~
D8493	81.0	16.2	17.1X	8.3	No
D8833	81.13	17.7	17.3X	8.5	No
D8791	80.4	—	17.2X	7.5	No
G2484	86.4	18.0	18.5	8.4	No
~~J9768~~	~~88.7~~	~~16.7 (6)~~	~~17.7X~~	~~8.1~~	~~X (6) prev. figs~~
D7849	80.8	16.1	16.8X	7.5	No
D7884	80.8	17.3	17.0X	8.5	No
D9185	83.0	—	18.3	8.4	No
D7416	~~88.8 (7)~~	16.6 (7)	17.6 (7)	8.1	X ( ) prev. figs.
USE E8	83.9		17.4	8.0	
D9562	~~79.0 (6)~~	~~17.0 (1)~~	~~18.0 (17.9)~~	~~8.3 (2)~~	~~X ( ) prev. figs.~~
D9874	82.5	15.9 a	17.1X	7.2	No
E3988	83.2	17.2	17.8	8.4	No
G2491	84.1	17.9	18.1	8.4+	No
D8859	80.0	—	17.3X	8.3	No

Rates & light

pmv	dist	sh.	
21.2	21.7	10.2	
20.3	21.3	9.8	
20.9	21.0	9.8	✓
20.1	21.7	10.1	
21.9	22.9 (23?)	10.45	✓
20.0	21.1	10.25	
21.8	21.3	10.45	
—	21.4	9.3	
20.8	21.4	9.7	
18.8	19.9	9.1	✓
19.9	20.8	9.3	
21.4	21.0	10.5	
—	22.0	10.1	
~~21.1~~	~~22.8~~	~~10.5~~	~~✓~~
19.2	20.7	8.7	
20.6	21.4	10.1	
21.2	21.5	10.0	
—	21.6	10.35	

11) 1885 / 17.0 — 14) 2467 / 19.6 — 14) 1148 / 28 (8.2)

11) 2265 / M 20.6 — 14) 2989 / 21.3 — 14) 1387 / 126 / 12.7 (9.9)

14 / 8 / 112 / 35 / 28 / 75

82.5 / 12386 / 115

~~591.8~~ / 839 / 64 / 64 / 4145.3 / 1238.6 / 53839 (82.8) / 520 / 183 / 130 / 539

1387 / 183.3 / 113.7 / 54.2 / 37.2 / 64.4 / 591.8 (9.3) / 567 / 24

1.2 / 20 / 4 / 4 / 7 / 14 / 63

Tarsi RLB
C. oc.
meas Oct 6, 1967

11.10.67

Pit 4

		prior dust	she	Ratios prior	dust	she
D7306	81.5	17.4	17.9	8.1	21.6	21.9	9.9
D8088	82.4	16.2	17.1	7.4	14.6	20.7	9.0

Pit 3

D8543	84.4	17.0	18.0	8.2	20.1	21.3	9.7
D8846	82.8	16.6	16.7	7.1	20.0	20.1	8.5
~~D8622~~	~~81.4~~	~~16.9~~					

8

Pit 67

E5558	83.3	16.5	17.7	7.7	19.8	21.2	9.2

4144 839 874 385 1011 1052 463

4968.3 929.3 1053.3 472.1 1215.6 1267.6 565.5

(65) 5 3827 (60) 1013.2 (65) 1140.7 (65) 519.6 (60) 1226.7 (65) 1372.8 (65) 611.8

M= 82.8 16.9 17.5 7.8 20.4 21.1 9.4

7.7
5 38.5
35
38
472.1
420
521
480

82.8
65 53827
520
182
130
527

16.9
16.88
60 1013.2
605
413
360
532
480
520

17.5
65 1140.7
65
490
455
357
325

7.8
65 519.6 60
455
556
520
36

20.4
1226.7
120
267

21.1
65 1372.8
130
728
65
7

9.4
65 611.8
585
268
240

Additions to Pit lists Coaffee Dauer

					Ratio		
Pit 4	Light	brown	fine	dark	gray	dark	clay
D7849	80,8	16,1	16,8	7,5	19,9	20,8	9,3
D7884	80,8	12,3	17,0	8,5	21,4	21,0	10,5
G2491	84,1	12,9	18,1	8,4	21,2	21,5	10,0
	245,8	61,3	51,9	24,4	62,5	63,3	29,8
P36 caved	79,1	17,0	17,8	7,8	21,4	21,5	9,8
J4974							
20 New	1659,8	317,7	345,2	152,8	381,8	415,5	183,8
	1900,5	368,1	396,8	176,6	444,5	479,8	213,4
	23	22	23	23	22	23	23
	82,6	16,5	17,2	7,6	20,2	20,9	9,2

	Total 17	Total (14)	Total 17	Total 23	Total 14	17	17
D8493	81,0	16,2	17,1	8,3	20,0	21,1	10,25
D8833	81,3	17,7	17,3	8,5	21,8	21,3	10,45
D8791	80,7	—	17,2	9,5	—	21,4	9,3
D9185	83,0	—	18,3	8,4	—	22,0	10,1
D8859	80,0	—	17,3	8,3	—	21,6	10,35
	405,7	33,9	87,2	41,0	41,8	107,4	50,4
	986,3	201,7	204,7	93,5	244,9	255,4	113,7
	1392,0	235,6	296,9	134,5	286,7	362,8	164,1
	17	14	17	23	14	17	17
	81,8	16,8	17,4	7,9	20,4	21,3	9,6

Pit 4 1659,5 245,7 1905,2 / 23 = 82,8 (184, 65, 46, 192, 184, 80)

81,8 / 17) 1392,0 (136, 32, 17, 150)

81,88 / 17) 1392,0 (136, 32, 17, 150, 136, 140)

16,8 / 14) 235,6 (14, 95, 84, 116, 112, 4)

17,4 / 17) 296,9 (17, 126, 119, 79)

17,9 / 17) 134,5 (119, 155, 136, 19)

14) 286,7 (28, 27)

213 / 17) 362,8 (34, 22, 17, 56, 51, 5)

96 / 17) 164,1 (153, 111, 103)

82,6 / 23) 1900,5 (184, 60, 46, 145, 138, 7)

17,2 / 23) 396,8 (23, 166, 161, 58, 46, 12)

7,6 / 23) 176,6 (161, 156, 138, 18)

20,2 / 22) 444,5 (44, 4, 0, 44)

9,2 / 23) 213,4 (207, 64)

prev - 3

More tales

~~F 369~~

Pt to 16, 13, 3, 4 (42) (43) (43) rate/hr 42 rate/hr 43 rate/hr 43 Length

prox Gr. dist sh. 860.2 907.7 394.0

708.0 751.2 332.6

Pt 2 33.9(2) 35.6(2) 15.2(2) 40.2(2) 42.4(2) 18.1(2)

Pt 77 34.5(2) 52.7(3) 24.2(3) 89.2(2) 60.9(3) 27.9(3)

61-67 51.8(3) 53.7(3) 24.9(3) 61.8(3) 64.5(3) 29.9(3)

Pt 60 31.9(2) 35.1(2) 15.6(2) 39.3(2) 42.4(2) 18.8(2)

Pt 4 51.3(3) 51.9(3) 24.4(3) 62.5(3) 63.3(3) 29.8(3)

Pt 3 38.9(2) 87.2(5) 42.0(5) 41.8(2) 107.4(5) 50.4(5)

Pt 16 18.0(1) 18.5(1) 8.4(1) 20.8(1) 21.4(1) 9.7(1)

57)963.2 62)1088.9 (2)487.3 57)1165.8 62)1310.0 62)583.6

16.9 17.5 7.8 20.4 21.1 9.4

963.2 1088.9 487.3 1165.8 1310.0 583.6

— 339 — 356 — 132 — 402 — 424 — 181

624 732 355 763 886 402

55)924.3 60)1053 60)474 55)1256 60)1267 60)565.5

55 60 420 220 120 540

379 453 54 36 67 255

339 420 34 33 60

40 33 21 3 7 15

16.9 Pt 2 17.5 7.8 20.4 21.1 9.4

added 80.8 16.1 16.8 7.5 19.9 20.8 9.3

Pt 4 80.8 17.3 17.0 8.5 21.4 21.0 10.5

84.1 17.9 18.1 8.4 21.2 21.5 10.0

2457 513 519 244 625 633 298

Length

77 35'5'5.7 (43)

61-67 259.8 (5)

60 249.5 (3)

added 4 165.5 (2)

3 245.7 (3)

16 405.7 (5)

86.4 (1)

60)4968.3(82.8

480

168

120

483

Added 81.0 16.2 17.1 8.3 50.0 21.1 10.2

Pt 3 81.3 17.7 17.3 8.5 21.8 21.3 10.5

80.4 — 17.2 7.5 — 21.4 9.3

83.0 — 18.3 8.4 — 22.0 10.1

80.0 — 17.3 8.3 — 21.6 10.3

4057 339 87.5 420 41.8 1074 50.4

16.9 17.5 7.8 20.4 2.1 9.4

57)963.2 62)1088.9 (2)487.3 55)1165.8 62)1310.0 62)583.6

57 62 434 184 124 558

393 465 533 250 70 256

342 434 496 228 62 248

51.2 31.9 37 .2 8.0

513

~~In the actual form,~~

~~Specific~~ distinctions from C. chatus are not evident in the ~~largest~~ specimens. Both species exhibit considerable variation ~~individual~~ ~~and that it would be difficult to~~ ~~Differences in size and proportions.~~

~~As~~ There appears to be no marked ~~appreciable~~ difference in size of the specimens from different pits, ~~no attempt has been made to segregate~~ ~~so attempt so as to separate~~ ~~Do the tables that follow~~ ~~Prep has been no attempt~~ Therefore no attempt has been made to segregate all ~~were~~ considered together in the tables that follow. Pit 4 is the best represented

D7036

✓D9160 — ✓D7440 — ✓D8822 — ✓F1840 —

✓D7473 —

✓D7417 — ✓E577 —

✓D9268 — ✓D7465 —

✓D9310 — ✓D7717 —

D9564. ✓D7570 —

✓D9744 — ✓D7568 —

16 Trial C oc. measured ↑

	length		prox		dist		shaft
T16	2336,4	17	128,1	(16)	231,5	(14)	127,1
16		15	269,0	21	305,2	(21)	188,1
21	3048,1	32	397,1 (18,0	36	536,7 (14,9	35	315,2 (9,0
	5384,5 (145,5		22		36		315
37	37		177		176		
	168		176		144		
	148		11		327		
	204				324		
	185						
	195						

Ratio b/sh

127,7

85,7

35) 213,4 (6,1

210

34

8,5
8,8
8,6
9,4
9,4
9,3
8,8
9,0
8,1
9,4
8,3
9,6
10,0
9,9

127

When the ~~xxxxx~~ bones series of Coragyps occidentalis from Rancho La Brea is compared with the ~~xxxx~~ comparable elements of C. atratus, the percentages which characterized the species in the original diagnosis no longer hold.

~~Although a study of a large series of Coragyps occidentalis bones from Rancho La Brea~~, The foregoing data on measurement alters the precise percentage differences noted in the diagnosis of ~~the species~~ C. occidentalis (Miller, 1909), the general picture of the species remains very much the same. Below is a comparison of the early/diagnostic percentages compared with percentages as ~~xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx~~ bassd on averages for the series in each species:

	Miller	Present averages
femur longer and heavier	107%	~~111~~ 112 % longer 115 % broader of shaft
Tarsus shorter	94%	~~103~~ 99% (~~maximum is 99%~~ max is 103%)
Tarsus stouter	109%	113% (minimum is 108%)
foot wider	116%	~~106%~~ (~~breadth across distal trochleae~~) it is not clear what measurements was involved here
humerus longer	108%	109%

DeMay (1941) in discussing the McKittrick representation of C. occidentalis refers to ~~the~~ Miller's original description, then adds, "The femur is longer and heavier, the tibiotarsus is shorter stouter ...." As there is no complete tibiotarsus in the McKittrick material which she examined, and as the tibiotarsus ~~is~~ in the RLB series averages 103% longer than in C. atratus, it would seem that/"~~t~~ the word tibiotarsus" was an error, intended for "tarsometatarsus" (the element ~~xxxxxx~~ mentioned by Miller.

The RLB

Mex vs. Mex vs C. atratus

Humerus 10
2 below min.
2 above aver.
6 within range under aver.
2 in range of atratus (1 below aver.)

Ulna 20
2 below ~~min~~
3 above aver.
15 below aver
2 in range of atratus (above aver.)

Carpus all below aver.
none as small as min.
all above aver.

Femur 16
all below aver
1 below min.
1 in range of ~~atratus~~ (above aver.)

Tibia
all below aver
3 below min.
1 below others in range (none = max)

Tarsus 15
6 below min.
1 above aver.
(14 below aver)
all below average
~~[illegible] min~~.

c

At the Los Angeles County Museum of Natural History, the vertebrate fossil collections now include not only the very large assemblage of Coragyps occidentalis bones from Rancho La Brea, but representation of this species from

Carpus Coragyps

RLB	74	75	76	77	78	79	80	81	82	83	84	85	86	87
	74,1	75,3		77,8		79,1	80,7	81,7	82,6	83,1	84,8	85,1	86,8	87,6
						79,6	80,3	81,8	82,4	83,9	84,5	85,9	86,8	
						79,8	80,8	81,0	82,2					
						79,7	80,1	81,9						
						79,4	80,5	81,0						
							86,0	81,8						
								81,2						

min. — mean — max

Mex	74,1	75,9	76,8	77,7	78,8	79,6	80,7	81,2
[21 bones]		75,8	76,6	77,5	78,4	79,6	80,3	81,2
			76,0	77,9				
			76,1	77,7				
			76,4	77,1				

100% below ave
RLB
NONE below min.

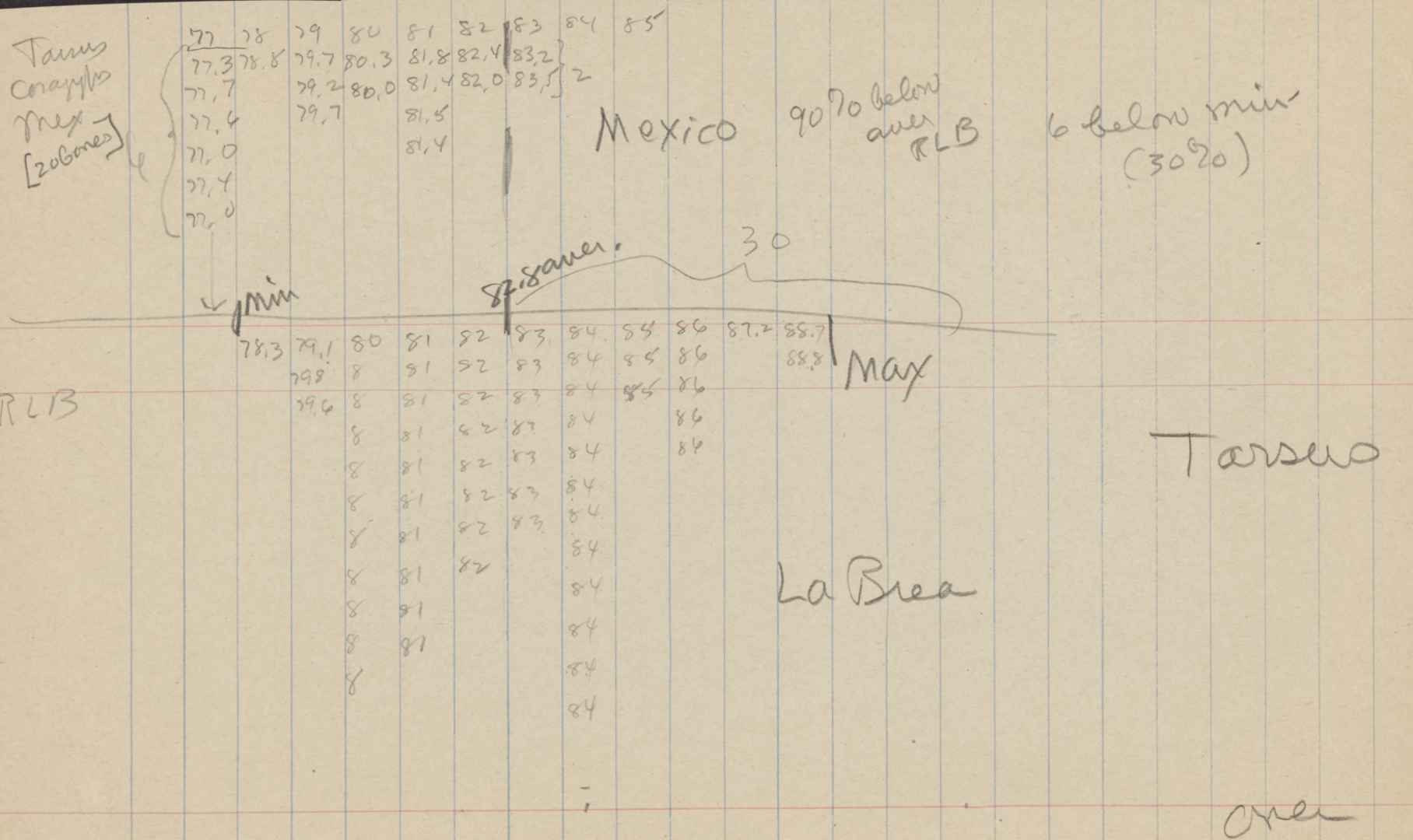
Rec 67,5 — 76,9 77,0 78,2

	below ave	below min			specims below min
~~Carpus~~	~~100%~~	~~None~~	Tibia	100%	16% (3)
~~Femur~~	~~100%~~	~~6%~~	Femur	100%	6% (1)
~~Ulna~~	~~85%~~	~~20%~~	Carpus	100%	0 (0)
~~Tarsus~~	~~90%~~	~~30%~~	Tarsus	90%	30% (6)
~~Coracoid~~	~~75%~~	~~14%~~	Ulna	85%	20% (2)
~~Tibia~~	~~100%~~	~~16%~~	Humus	80%	20% (2)
~~Humerus~~	~~80%~~	~~20%~~	Coracoid	75%	14% (6)

Table 7

Tarsometatarsi

		C. atratus	RLB (64)	McK (3)	Carp (2)	SCC (1)	C C (1)	H C (2)	SJC (21)
Greatest length	Max.	86.0	88.8	90.4	87.8				83.5
	Mean	83.0	82.8	86.5			78.3a		79.3
	Min.	76.0	78.3	84.3	82.1				73.5
Proximal breadth	Max.	15.8	17.9	17.7	~~18.7~~	17.0			17.1
	Mean	14.9	16.9	17.2				16.4	16.1
	Min.	14.3	16.0	16.8	~~17.0~~	16.7			~~15.7~~
Distal breadth	Max.	17.7	18.7	18.7	18.3				~~17.6~~
	Mean	16.4	17.5	18.5		17.8			~~16.6~~
	Min.	15.4	16.5	18.4	17.0				16.1
Least transverse breadth shaft	Max.	7.4	8.6	8.6	7.9				~~8.5~~
	Mean	6.8	7.8	8.1		7.8		7.7	7.7
	Min.	6.5	7.0	7.5	7.5				6.8
Ratio proximal breadth to length	Max.	19.1	21.8	20.8	20.3				22.8
	Mean	17.7	20.1	19.4					20.1
	Min.	16.6	18.8	18.1	19.4				18.9
Ratio distal breadth to length	Max.	20.2	22.9	21.9	20.9				22.0
	Mean	19.7	21.1	21.4					21.7
	Min.	18.6	19.8	20.7	20.6				20.0
Ratio shaft breadth to length	Max.	8.8	10.5	10.1	9.6				11.0
	Mean	8.4	9.2	9.5					9.9
	Min.	7.8	8.6	8.3	8.5				8.2


Taurus
Corapylus
Mex
[20 Genes]
77 78 79 80 81 82 83 84 85
77.3 78.8 79.7 80.3 81.8 82.4 83.2
77.7 79.2 80.0 81.4 82.0 83.5
77.4 79.7 81.5
77.0 81.4
77.4
77.0
2
Mexico
90% below and RLB
6 below min (30%)
min
82.8 saver.
30
78.3 79.1 80 81 82 83 84 85 86 87.2 88.7
79.8 8 81 82 83 84 85 86 88.8
79.6 8 81 82 83 84 85 86
8 81 82 83 84 86
8 81 82 83 84 84
8 81 82 83 84
8 81 82 84
8 81 84
8 81 84
8 84
84
Max
RLB
Tarsus
La Brea
over

SF	59	60	61	62	63	64	65	66	67	68	69	>0
58.5	59.4	60.7	61.9	62.4	63.8	64.4	65.3					
	59.8	60.5	61.7	62.0	63.3	64.2	65.3					
	59.6	60.4	61.0	62.1	63.8	64.0						
	59.4	60.8	61.0	62.4	63.8	64.3						
	59.5	60.7	61.9	62.8	63.7							
			61.4	62.7								
			61.6	62.8								
			61.0	62.9								
				62.0								

5 one away of RLB

Mexico

75% below one RLB

6 below minimum (14%)

[40 Bones]

6 below min RLB

64 Meters

	60.6	61.2	62.2	63.0	65.9	66.9	67.5	68.6	69.4		
		61.0	62.3	63.2?	65.9		67.8	68.6			
		61.4	62.0	63.1	65.9		67.5				
		61.6	62.0	63.1			67.0				
		61.5	62.3	63.1			67.1				
			62.3	63.3							
			62.9	63.0							
			62.4	63.0							
			62.5								
			62.9								

Min

Max

RLB

La Brea

CORACOID

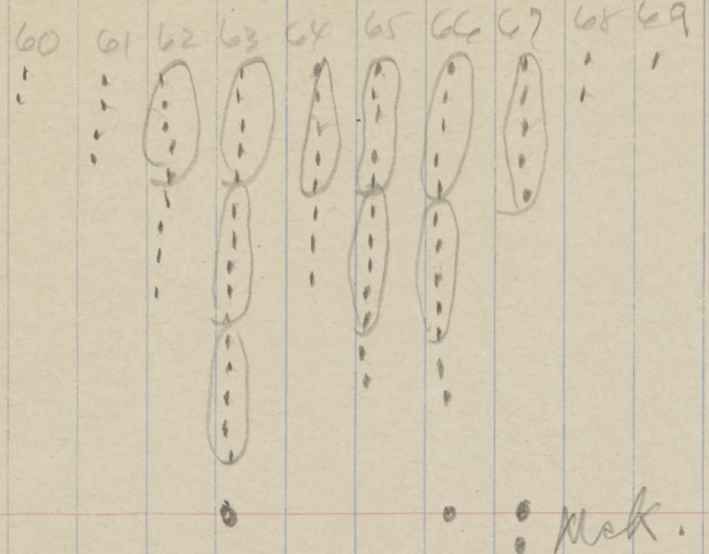
55.6	59.0	60.7	
		60.6	

Recent

ORL

Coregonus tullibee		8.2	3	4	5	6	7	8	8.9	9.0	1	2	3	4	5	6	7	8	9	10	10.1	2	3
Lake Michigan		8.2					8.7		8.9	9.0		9.2	9.3	9.4	9.5	9.6	9.7			10.0	10.1		10.4
									8.9							9.6	9.7			10.0	10.1		10.5
																9.6				10.0			
Rec.						8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	10.1	10.2	10.4
						8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4		9.6	9.7	9.8	9.9		10.1	10.2	10.5
							8.7		8.9	9.0	9.1	9.2	9.3	9.4		9.6	9.7	9.8			10.1		10.3
									8.9			9.2	9.3	9.4		9.6	9.7	9.8			10.1		
													9.3										
													9.3										
													9.3										
													9.3										
													9.3										

Coacoíde Lateral



...sent the same racial ...

In comparison with the Rancho La Brea series, 93 per cent ... the referred Mexican material falls below tne mean of C. occidentalis occidentalis, and 14 per cent below the minimum. See Table 9.

Mean of type SJC mex: 18. length 73.5, gr br. prox rel post 22.8 cent 16.8, ml. br 11.0 ~~dist br~~ th 8.1

.. .. type oc, gr length 82.5 .. .. " 17.1 " 7.5 gr l. dist 17.3

ratio prox/length 20.7%

.. dist/length 20.9%

.. ml/length 9.6%

Coragyps occidentalis mexicanus n. subsp.

Type: Tarsometatarsus LACM collected by Calif. Inst. Tech. party, 19

Age and Locality: Upper Pleistocene, San Josecito Cave, Nuevo Leon, Mexico.

Diagnosis: Compared to minimum measurements of the Rancho La Brea form approximately 1 per cent shorter, but 11 - 16 percent greater in breadth of ends and shaft relative to length. Compared to mean of Rancho La Brea 6 per cent shorter, [illegible]cent stouter.

66

D9835 64.2

D9869 66.8

P2

D9736 66.9

D9740 65.6

D9751 63.3

P61-67

E387 61.7

E543 62.9

E437 63.4

E396 63.8

E471 65.1

5) 316 8 (63.3

30

16

17 18

Crowned P4

D7224 61.6

D7604 63.1

D7512 63.1

D8085 63.1

D7027 63.3

D8474 63.0

D8380 63.0

D8185 63.5

D7261 67.5

D7414 66.8

D7052 65.9

D7507 65.9

D8356 64.0

D7269 65.6

D8017 64.5

D7898 65.9

D7452 63.5

D8085 63.0

D7960 66.2

H3877 62.8

D9120 65.3

D7335 65.6

D8243 66.7

23 1479 0 (64.1

138

96

92

40

P3

D8619 60.3

F1849 60.8

D8849 61.5

D8627 62.4

D8720 62.5

D8585 62.9

D8774 65.3

E587 64.9

H3881 65.9

D9043 64.8

D8563 66.0

D8803 63.7

D8482 64.3

D8623 64.3

14) 891 6 (63.8

84

51

42

9 6

P16

D9249 61.2

D9610 62.3

D9257 69.4

D9215 67.8

E674 68.6

D9070 64.6

D9285 64.5

D9204 63.9

D9278 63.3

D9487 65.2

D9244 65.2

D9312 63.2

D9604 66.9

13) 84 8 1 (65.2

78

68

65

31

1B

E259 62.2

E321 62.6

E98 62.3

E183 68.4

E252 67.0

E173 66.5

E129 66.1

E98 65.1

E55 66.7

E159 64.7

65 3 8

P63

D8916 92.3

D9129 82.6

D8539 97.0

D9251 98.9

D8525 93.3

D9125 89.9

16) 5144 0 (94.0

54

24

P64

D9407 95.6

D9558 98.2

D8157 89.2

D9503 95.6

D9501 96.3

D8129 96.0

D8122 90.7

D8175 90.2

D9580 91.5

D9377 95.5

D9564 89.3

C9963 90.8

E4134 90.1

D8123 95.4

14) 1308 (93.0

354

126

42

4

Linear Cavalry

P14 Leg Pho Tib/Hum. comparison
Humeri

	Tibiae
D8334	138.7
D7230	148.8
D7375	138.0
D7415	139.4
D8001	147.8
D7948	146.8
D8327	142.0
D8261	142.1
~~D7555~~	~~146.3~~ P14
D8066	146.9
D8125	(150.5)
D7441	145.1
D7451	147.7
D7879	146.5
D7440	147.0
D7417	142.4
D7717	141.6
D7510	(138.2)
D7036	144.6
D7473	147.4
D7568	143.7
D7465	147.4
D8066	146.5

D7393	148.0
D8355	148.4
D7179	145.8
D7316	147.2
D7442	153.1
D8319	146.9
D7209	150.4
D7630	145.6
D7915	145.8
D8260	150.1
D7423	148.6
D8292	154.2
D7295	153.0
D7258	151.4
D8124	143.4
D8154	(155.9)
D7218	148.3
? D8074	(140.1)
D7702	149.2
D7458	142.9

146.3 (146.8
22) 3231
22
103
88
151
132
195

23) 3378 (146.8
23
107
92
157
138
198
184
14

138.0 −
150.5

20) 2968 (148.4
20
96
80
168
160
8

98
1484) 14680
13356
13240
11872

Coraquo Humeri ratio Br. or D Lyth

7.3 – 7.5	7.6 – 7.9	8.0 – 8.3
✓148.0 ✓	~~152.9~~	– 142.6 ✓
✓144.3 ✓	~~145.8~~	– 146.9 ✓
✓148.4 ✓	147.2 ✓	– 142.1 ✓
153.1 ✓	143.4 ✓	– 145.8 ✓
✓150.4 ✓	147.8 ✓	– 146.8 ✓
✓150.1 ✓	147.3 ✓	– 144.7 ✓
~~146.6~~	145.6 ✓	– 143.4 ✓
✓153.0 ✓	153.2 ✓	– 147.8 ✓
✓149.1 ✓	~~154.2~~	153.8 ✓
✓151.4 ✓	~~148.4~~	148.8 ✓
155.9 ✓	146.6 ✓	
✓146.7 ✓	150.2 ✓	
✓144.3 ✓	148.3 ✓	
	149.2 ✓	
	147.3 ✓	
	~~146.9~~	
	149.2 ✓ ✓	
	149.9	
	142.9 ✓	

6 over 150
9 over 148
3 under 148

4 over 150
9 " 148
10 under 148

1 over 150
2 " 148
8 under 148

under 7.6	7.6	over 7.6
144.3 (1)	152.9	~~147.2~~
146.7 (1)	145.8	143.4
148.0	140.6	– 147.8
148.4	154.2	– 147.3
149.(1.)	14	– 145.6
150 (2)		153.2
151 (1)	147.2	~~146.6~~
153 (2)	143.4	156.2
155 (1)	146.6	148.3
~~16~~	149.2	~~149.2~~
16	4	– 147.3
		~~152.7~~
		– 146.9
		149.2
		149.9
		– 142.9
		~~20~~
		21

8 over ave leg 148
over 8 narrow lumen under 148

14 over ave lyth

8 broad lumeri
Three under 148
Three over 148 lyth

19 above ave lyth (148+)
21 under ave.
1 over.

40

under ave lyth 19
14 have narrow br.
5 " under "
over ave lyth
10 have narrow br.
7 " broad "

~~To test the~~ determine whether ~~the populations from separate~~ ~~pits were distinct~~

~~Free measurements taken~~ inside

pits showed any appreciable variation, the tarsal measurements were checked. The mean length was found to vary from 81 mm in Pit 13 (only 4 specimens) to 84.0 mm (Pit 14, 7 specimens. Pit 3 with 12 had a mean of 81.8, Pit 4 with 23, 82.4

		Lwr Br. hyp	dist	sh	prop hab		
May 82.7	Pit 13 — 81.0	16.8	17.7	7.7	20.5	21.5	9.3
86.4	Pit 14 — 84	17.3	17.9	7.9	20.6	21.3	9.0
86.0	Pit 3 — 81.8	16.8	17.4	7.9	20.4	21.3	9.6
88.7	Pit 4 — 82.4	16.5	17.2	7.4	20.2	20.9	9.2

Corrected oc. RLB

San Joaquin — mean measurements — RTB — C. atratus

Coracoid
length
br

Humerus
length — 144.3 — 148 — 135.4
prox — 21.0 — 20.6 — 19.5
ratio dist — 18.6 % — 18.4 — 17.8
sh

Ulna
length — 145 — 166.1 — 155.9
prox
sh

Carpus
length — 76.9 — 81.6 — 74.9
trochl
Mc

Femur
length — 91.2 — 95.0 — 84.7
dist
sh

Tibia
length — 140.2 — 145.5 — 140.3
prox
dist
sh

Tarsus
length — 79.6 — 82.8 — 83.0
prox
dist
sh

Variability in the extinct blackbuck
C. cr. 1

natus elements

tibia/ulna 86, 87, 88

tib/hum 99, 98, 96

tars/hum ~~OR as quin~~ 54, 55, ~~57~~

" /fem 86, 87, 88

" /carp 101, 101, 105

" /crac. ~~OR~~ asis 128, 128

549
1426) 783010
7130
7000
5704
12960
12834

	prox
62.6	18.2%
60.8	18.5%
63.0	18.4%
✓ 67.5	17.9%
✓ 67.3	18.5
✓ 68.6	18.5
✓ 66.0	18.0
✓ 65.1	18.4
✓ 66.3	18.1
✓ 66.8	17.9
✓ 66.2	18.4
62.4	18.4
✓ 66.9	17.9
✓ 65.1	18.4

Cacoids
Conglys

✓ 64.9	18.8%
✓ 65.6	18.6
✓ 66.5	18.8
✓ 65.9	18.6
63.8	18.9
64.2	18.7
63.3	19.1
64.3	19.1
63.2	18.6
✓ 66.7	18.6
62.3	19.1
60.3	19.0
62.3	19.1
61.6	19.1
61.5	18.8
62.4	19.1
63.0	18.9
✓ 69.4	18.7
✓ 66.9	18.9
✓ 68.6	18.6
✓ 65.9	18.8

19 above aver length

Geographic Variation

The San Josecito Cave assemblage is sufficiently large to provide significant compariwon with that from Rancho La Brea.

Rel breadth max crafts compared RLB + Recent

Coracoid 39 4 larger (RLB 5 smaller) all Muscovulgar aver larger
two

Humerus
max 7 all within range of RLB (with gues both above + below) aver larger
sh 10 " " " " " " " " "
8 above average

Ulna 20 average is larger 3 exceed max RLB
Shaft

Carpus 21 4 larger than RLB (1 RLB smaller) aver larger
sh M_2

Femur all within RLB average same RLB has 3 larger
sh 14 and 3 smaller
(24 labrea)

Tibia
sh 18 3 above RLB (1 RLB below max) 15 max + 20 RLB overlap
average larger

Tarsus completo nullap two average is larger
sh 20 max
64 RLB 14 above aver for RLB but 1 below min.

C 9963 - femur P. 4
C 5578 - femur P4
J 9288 nodaka
J 9231 ulnas P#3 caved
H 2048 carpus P#8 1
B 3428 "
H 2051 " P#3 caved
Check P#91

1 cor
1 humer
1 carpus ? E 69497
"Pavo"

17.6
645 / 11400
645
4950
4515
4350
3870
480

No. of bones of each element — Prat. oreolaps C. atratus

	R L B	Mexico	# Mex smaller than or smaller than min.	# Mex smaller than or smaller than aver.	Recent subsp of C. atratus
Humerus (50)		10 2	2	8	
length	0	0			C. a. a. ♂ 414-445 (426)
breadth prox	0	1			♀ 414-438 (426)
" dist	0	0			C. a. brasilianus ♂ 386-410 401
" sh	1				♀ 385-413 400
rel br. prox					
ulna (30)	7 less than 1/4	9 (19) abt 1/2	2	17	C. a. jacutus ♂ 412-437 (421)
length	7	12 (16)			♀ 416-422 (419)
br prox	8	7 (19)			
br sh	5				
carpometa		15 (20) 4/5	0	21	
length	3	11 (19)			
Br troch	8	1 (17)			
Br. M2	5				
Depth M1	12 (32)	16 (21)			
femur			8	16	
length	0	(16) 1			
Br dist	0	1			
Br sh	1	2			
Tibia		18 (1 under) 3. (18)		18	
length	16	0			
Br. prox	0	1			
Br dist	0	2			
Br. sh	2				
Tarsus		(15) 15 abt	6	17	
64 length	57	7			
Br prox	0	15			
Br dist	44				
native Br sh	10	3	1	1 (2 at M) above aver	11 (14) Total
coracoid (22)					
length	1				
Br dist	1				
Br sh	3				
Ht upper part					

ratio tarsus to humus

	Recent	RLB	Mex
max	60.0	57.1%	56.3
mean	61.3	56.0%	55.2
min	61.7%	54.9%	57.4

ratio femur to humus

max	61.6	65.1	63.6
ms	62.5	64.2	63.3
min	63.5	65.9	64.3

ratio tarsus to tibia

max	58.8	57.6	59.9
m	59.1	56.9	56.8
min	57.1	56.6	58.6

ratio humus to ulna

max	88.2	86.9	87.1
M	86.9	89.1	87.5
min	86.3	91.1	85.4

ratio carpus to humus

max	54.9	56.4	54.6
mean	55.2	55.2	53.3
min	54.3	52.0	55.6

ratio tibia to humus

max	102.8	98.9	96.7
m	103.5	98.5	97.5
min	107	96.6	97.8

ratio tarsus to femur

max	98.0	87.7	88.3
ms	98.0	87.3	87.5
min	96.0	86.1	88.3

Recent

Tarsus/humus	60-61%
tib/humus	103-107%
fem/humus	61-63%
tars/fem	96-98%

Fossil

55-57%
96-99%
63-65%
86-88%

Tarsi C. cr. RLB max + min lengths compared for rel. br.

Length	rel. Br.
86 -	9.3 +
88.7	9.1 —
86.0	9.5 +
86.1	9.4 +
87.2	9.3 +
86.4	8.8 —
86.4	9.7 +
88.8	9.1 —

length	rel. br
79.1	10.3 +
80.8	9.9 +
79.8	8.7 —
80.3	9.9 +
80.4	9.3 +
78.3	9.7 +
80.0	9.3 +
80.2	9.2 —
80.3	9.9 +
79.4	10.1 +
80.8	9.3 +
80.8	10.5 +
80.0	10.3 +
80.4	9.4 +

rel Br.	length
10.2	(84.1) +
10.1	83.0 M +
10.4	79.2 —
10.2	81.0 —
10.4	81.3 —
10.5	80.8 —
10.1	83.0 M +
10.5	(79.0) —
10.0	(84.1) +
10.3	80.0 —
10.1	79.4 —

rel Br.	length
8.8	(86.4) +
8.9	83.0 ~~M~~ +
8.7	82.5 —
8.7	(79.8) —
8.9	84.1 +
8.8	84.7 +
8.6	84.8 +
8.6	81.0 —
8.7	82.8 M
8.9	83.9 +
8.9	82.8 ~~M~~

78 II 2
79 IIII 4 } 6
80 IIII III 11
81 IIII III 10 } 21
82 III 8
83 III 7 } 13
84 I III 13
85 III 3 } 16
86 III 5
87 I 1 } 8
88 II 2

10.5
9.2 9.2
1.3

83.8
81.0
82.6
82.2
82.9
82.5
84.1

7) 577 (82.7
56
19
14
51

503,1 6

328,2 4

986,3 12

1659,5 20

1154,7 14

589,6 7

63 | 5221,4 | 82,8

504

181

126

554

504

50

31 | 82,7-

2 | 828 | =

30 | 82,9+

5221,4

+ 79,1

64 | 5300,5 | 82,8

512

180

128

525

1 indiv. in early list

Approximately 120 of the 200 avian bone fragments collected in 1964-1965 during the excav. can be [illegible] Daniel

for the 90
10.4 - 9.2
84.1 80.8
84.1
85.1

for 90
8.6 - 9.0
85.7
88.8
82.5

lengths

10.7.67 coarse tarsus
Ratios of br to leg

10.0 - 10.4
84.1 +
83.0
79.2 —
81.0 —
81.3 ✓
80.8 ✓
83.0
79.0 ✓ —
83.2 +
84.1 +
80.0 ✓ —

79 - 84.1

79 II
80 II
81 II
82
83 III
84 I

9.9 - 9.5
84.1 ✓
85.1 ✓
86.4 ✓
84.3 ✓
82.4 ✓
81.8 ✓
80.8 ✓
82.4
80.3
86.0
85.3
98.3
84.3
81.2

80.3
82.2

>81
>9
80 III
81 II
82 III
83
84 III
85 II
86 II

9.4 - 9.0
80.4 ✓
88.7 ✓
80.8 ✓
88.8 ✓
86.1 ✓
86.0 ✓
84.8 ✓
82.7 ✓
81.3 ✓
84.3 ✓
80.4
83.4
81.2
80.0
85.4
81.4
80.3
81.4
84.6

84.5
83.3
81.7
80.4
87.2

80 IIII
81 IIII
82 I
83 II
84 IIII
85 I
86 II
87 I
88 II

8
82.5 ✓
82.8 ✓

79.8 X —
84.1 +
84.7 +
82.5
84.8 +
81.0 —
82.8
83.9 +
84.4 +
85.0

79 I
80
81 I
82 III
83 II
84 III
85
86 I

ave 90 br
9.2

9.9
83) 82.80
74 7
81 0
74 7
630

10 2.3
765) 783
765
18000
13 1 3 0
2700

mean Gr. 9th 7.8 tarsus coxa/pos

" fur 16.9

" dirt 17.5

" light 82.8

gr Nauvanch 28 x+=32

8.0	80.8	− 13−
8.0	80.3	−
8.2	86.0	+
8.2	85.3	+
8.3	84.3	+
8.0	81.2	−
8.2	85.1	+
8.2	84.8	+
8.0	80.3	−
8.0	84.5	+
8.1	(79.6)	−
8.4	84.1	+
8.3	84.1	+
8.4	83.0	+
8.3	81.0	−
8.5	81.3	−
8.4	86.4	+
8.5	80.8	−
8.4	83.0	+
8.4	83.2	+
8.4	84.1	+
8.3	80.0	−
8.1	87.2	+
8.1	(88.7)	+
8.1	86.1	+
8.2	84.3	+
8.2	79.1	−
8.1	82.4	−

7.9	81.8	−
7.9	83.4	+
7.9	84.6	+
7.9	82.2	−

less Praevanch 26 + 4 = 30

(8+) 12+ 18− 18−

X 7.4	82.8	+
7.4	82.7	−
7.5	81.3	−
X 7.0	79.8	−
7.6	82.8	−
7.5	80.4	−
7.6	78.3	−
7.5	81.0	−
7.5	80.0	−
7.5	84.1	+
7.6	81.4	−
X 7.4	80.3	−
7.5	81.4	−
X 7.2	84.7	+
V 7.4	82.4	−
X 7.3	84.8	+
X 7.0	81.0	−
X 7.2	82.8	+
7.5	83.9	+
7.5	80.4	−
7.5	80.8	−
X 7.2	82.5	−
7.6	86.4	+
7.6	81.7	−
7.6	80.4	−
X 7.4	83.0	+

7.7	84.8	+
7.7	84.3	+
7.7	85.4	+
7.7	83.3	+

Since the Calif. Inst. of Tech. fossil collection was acquired by the Los Angeles Co. Mus., I have had opportunity to examine also the previously recorded material from Mex., Cañaderia & Huasteca, Mex. The measurements obtained from these collns. are significant in attempting to

Tibia																				
RLB?	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149
									138.7	139.9	140.7	141.1	142	143.7	144.5	145.7	146.8	147.8	148.8	150.8
									138.0	139.9		141.6			144.0	145.1	146.3	147.1	148.3	150.5
									135.2								146.9	147.5	148.8	151.8
									135.2								146.5	147.7		152.2
																	146.7	147.0		153.0
																145.5		147.4		
																over,		147.4		
																		147.4		
Mex	130.5		3 below min.						137.9	138.7	139.3	140.6	141.4	142.9	145.9	145.1				
[18 bones]			(16%)						137.6		139.1	140.0	141.2	142.5						
											139.4		141.4	142.0						
											139.6									
Rec.			133.2								140.3	141.8					146.1			
											140.0									

100% below over, RLB

RLB

Mex

Cotype Tibiotarsus

65.9
4)2638
24
23
20
38

63.6
62.0
63
2
126

145.1
21)3048(
21
94
84
108
105
31

690.
633
20)13236
120
123
120

75.95
126
333

23364
30481
37)538.5(145.5
37
168
148
204
185
195

690
128
121 8
75.9
22)1977(6
132
67

690
128
22)8818(6
759
22)1577(6
132
25

119
122
241

6)384
36
24

690
125
818
759
22)1577(6
132
625

12)759
72
39

690 10
2 } 12
12

1,6 6.9
241
1428

142.8
237.9
22)2699(12.2
22
49
44
59

759
690
22)1449(65.8
132
129
110
190

102.4
88.4
22)1908(86
176
148
4

	3 (14	4 (13	16 (13	17 (1)	2 (3)	13 (16)	61-67 (5)	60 (3)		
coracoid	66.3 (14)	62.5 (3)	68.6 (13)	67.0 (1)	66.9 (3)	68.6 (10)	65.1 (5)	66.8		
max					65.6	65.1	63.3	64.2		
mean	63.4	64.1	65.2	—	63.3	62.2	61.6			
min	60.3	62.4	61.2	—						
femur										
max	150.2 (8)	155.9 (20)	153.8 (6)	152.3 (2)	149.3 (3)	149.9 (1)	153.2 (4)			
mean	147.8	148.4	148.1	148.7	144.3		148.4			
min	146.6	140.1	143.4	—	142.6		144.3			
ulna								(1)		
max	171.5 (6)	179.3 (17)	175.6 (2)	—	170.6 (2)	170.5 (1)		161.8		
mean	162.5	166.5	—	—	—	—		—		
min	156.8	156.3	—	—	161.5	—		—		
carpo.										
max	84.4 (7)	86.8 (12)	86.8 (2)	87.6 (1)	— (0)	85.9 (3)	81.7 (3)	— (2)		
mean	81.5	80.9	—	—	81.0	83.1	80.3	81.0		
min	79.4	78.3	80.5	—	—	79.0	79.6	77.8		
femur										
max	96.3 (6)	98.9 (14)	99.0 (2)	96.7 (3)	96.9 (1)	93.0 (1)	96.3 (1)			
mean	94.0	93.0		95.1						
min	89.2	87.6	90.8	92.8						
tibio										
max	148.8 (12)	150.5 (22)	153.0 (4)	153.8 (1)	151.2 (1)	—				
mean	144.1	146.8	147.4	—	—					
min	138.7	138.0	138.2	—						
tarsus										
max	86.0 (17)	88.8 (23)	86.4 (7)	88.7 (3)	86.4 (2)	82.7 (4)	84.1 (3)	83.0 (2)		
mean	81.8	82.8	84.2	86.6	—	82.0	83.1	82.5		
min	78.3	79.4	79.1	85.9	81.7	81.3	82.2			
totals	(70)	(131)	(37)	(11)	(13)	(20)	(16)	(7)		

70
131
37
11
13
20
16
7
305

Tonnes à bœufs 5"5" 60

" " " fers 8 6 96

" " " canons 10 0 110

" " " crics 12 7 137

85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 | RLB

88.8 90.1 91.8 92.3 93.0 94.7 95.2 96.5 97.3 98.1 99.7 101.2 | Max

90.9 91.0 92.1 96.1 97.4 98.3

91.2 97.8 98.4

91.4 97.0 98.6

95.0 aver. 97.1

RLB

85.6 | 1 below min. (690) 89.6 90.1 91.3 92.9 93.6 94.7

89.7 90.6 91.9 92.9 93.2

89.9 90.3 92.9

90.5

[16 bones]

Mexico

Dry
100 90 below
aver 9 RCB

79.2 84.7 87.0 87.9

83.9 86.0

Ru
Jamison

Ulna Carolyn

156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171

Mey 155.5
155.1

159.4 160.2 161.4
160.3 161.9
160
160.1
160.2

163.1 164 165.1
163 164.5 165.0
165.6

167.1
167.1

170.1

2 below num. (20%)

166.1 aver.

85% are below aver of RLB

RLB 156.3
156.8

159 160.2 161.5 162.9 165.8 164.6 165.0
160.5 161.5 163.7 164.3
163.2
164.8

167.7 168 169.7 170 171 173.4 179.3
168.9 168.2 164.0 170 171.5 175.6
167.7 169

MG

144.3 157.5 160.6 161.5

133–138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153-54

Mex robusto: 133,8 ↓ 139,6 ↓ — 2 below min. (20%)

Mexico

144,3 ↓ 145,8 ↓ 146,1 ↓
145,1 ↓ 146,4 ↓
146,5 ↓

148,2 ↓
148,5 ↓

80% below aver RLB

Min
142,6 143,8 144,3 145,8 146,9 147,2
142,9 143,4 144,7 145,6 146,8 147,8
144,3 145,8 146,6 147,3
146,7 147,8
146,9 147,3

aver.
(148) 149,1 150,4 151,8 152,9
148,8 149,2 150,1
148,6 149,2 150,2
148,3 149,7
148,8

Max
153,1
153,2 154,2
153,0 155,9
153,2 155,9

RLB

RLB 41

Rel. 124,8 — (135,4) 137,0 133,3 — 140,8 — 142,2

Humerus

85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101

RLB
87,6
89,2 90,7 91,5 93,0 95,1 96,3 97,3 98,9 99,0
89,3 90,2 93,3 95,2 96,0 97,0
89,9 90,8 95,6 96,3
90,8 95,5 96,9
90,1 95,4

85,6
May
89,6 90,1 91,9 92,9 93,6 94,7
89,1 90,6 91,3 92,9 93,2
89,9 90,3 92,9
90,5

very less mob

77,9 83,5 86,3
Rel. 88,9 86,5
86,0

Femur

RLB

76.5 | – 1

77.1
77.2 } 5
77.4
77.6
77.6

78.7 – 1

79.0 – 1

– 1

80.6
81.4 } 3
81.5
81.9

82.0 } 2
82.4

83.5 – 1

---

15) 119 7 4 2 (79.6
105
144
135
94

Tarsi

78.3

79.1

79.8
80.3
80.4
80.4
81.3 – 81.0
81.5
81.8

82.4
82.4
82.7
82.8
83.4

84.3
84.3
84.3
84.8

85.3

86.0
86.0
86

76-78 79-80 81-82 83-84

77.4
77.4
77.4
77.2
79.1
78.7
79.0
80.6
81.9
81.5
81.4
82,4
82,0
83.5
83.
only 1 above
another 83

76.5
76 77 78 79
80
81
82

78 79 80 81 82 83 84 85 86 87 88

78 79 80 81 82 83 84 85 86 87 88
78.3 79.1 80.3 81.0 82,4 83,4 84.3 85.3 86.6 82,2 88.7
79.8 80.4 81.3 82,4 83,9 84,3 85.4 86.0 88.7
79.6 80.8 81.8 82,7 83,3 84.3 85.1 86,1
80.0 81.2 82,8 83,0 84.8 86,4
80.3 81.4 82,5 83,0 84,1 86,4
80.3 81.4 82,8 82,0 84,6
80.4 81.0 82,2 83,2 84,7
80.4 81,7 82,5 84,8
80.8 81.0 84,5
80.8 81.3 84,1
80.0 84,1
84,1

RLB
63

76.0 82,7 83,5 84,7 85,1 86 Rec

Pit 16

Tib

D9555 – 146.3

D9564 – 138.2

D9268 – 142.2

D9310 – 153.0

D9263 – 147.4

5)737.1

147.4

146.3 – 153.0

Humo

D9551 152.9

D9256 143.4 V

D9243 147.3 V

D9478 146.8 V

D9552 144.7 V

D9421 153.8

6)888.9

148.1

143.4 – 153.8

99%

148.1)147.40

13329

141 10

Pit 13

Tib

Fem

F43 149.7

Pit 3

D8488 141.1

D9085 139.9

D8652 145.7

D8507 147.5

D8528 144.0

D9120 147.5

D9160 146.7

E577 148.3

D8822 140.8

F1840 140.7

D8571 143.3

D8834 138.3

12)1729 (144.1

12

52

48

49

48

12

138.7 – 148

D8518 147.8

D8897 147.1

D8467 146.4

D8531 147.8

E584 150.2

D8534 146.7

D9068 149.2

D8483 146.9

8)1182.3 (147.

8

38

32

62

56

63

146.6 – 150.2

Pit 17

tib fem 102

tarsus/cran 123

tars/fem 57

tars/tib 91

tars/carpus 100+?–

Carpenter

6 1
E441 81,7
E444 79,6
E352 79,7
241 0
80.3

4
D7263 80,7
B6749 81,8
D8410 81,0
D7883 80,3
D8211 80,8
B4043 74,1
D7607 88,1
D7242 83,9
D7516 79,8
D7765 81,8
D7484 86,8
D7942 75,3
12)9774 (80,9
96
114

P.t 2
D9731 81,0

4
D9267 86,8
D9197 80,5

3
D8876 84,7
D8496 81,9
D9042 82,6
B3428 80,1
D8868 82,7
D8580 79,7
D8991 80,0
7)5708 (81,5
56
10
7
38

13
E256 79,0
E57 84,5
E61 88,9

6 0
D9854 81,2
9053 77,8

P. 2
D9758 161,5
D9763 170,0

6 0
D 9867 161,8

P.t 4
D8500 156,3
D7165 179,3
D7029 161,5
D8070 162,9
D7582 163,8
D7917 167,7
D7511 165,0
D7121 171,0
D7761 168,0
D7314 163,7
D8026 167,9
D8403 169,7
D7449 169,0
D7909 167,7
D7520 168,2
D8282 169,0
D7132 160,5
17)2831 (166,5
17
113
102
111
102
92

16
D9428 173,4
D9664 175,4

3
D8495 160,2
E1841 171,3
D8503 164,3
D8502 163,2
D9051 154,0
D9231 156,8
6)977 (162,5
6
37
36
15
12
30

13
E192 170,5

Bones from P.77

Tibia 153.8 br dist 15.9 ratio 10.3 (br sh 9.25 ratio 5.9) Max
F 7379

Coracoid
E 3 67.0 br 12.9 ratio 19.2% above M
trio.

ulna none

carpo. 87.4 (Rt trech 9.9, br. Mc 8.0 ratio 9.1) max ratio 11.3
D9941

femur — 94.0 22.9 br dist., lent br. sh 10.4 below Mean
J9581 92.8 2835
P J9536 96.7 95.1
D9729
Tq
E 31 87.2 prox 17.8 (20.4%) dist 17.7 (20.3%) sh. 8.1 (9.3%)
2598
J9768 88.7 " 16.7 " 17.6 (19.8) 8.1 (9.1) near max
F 8 86.6 83.9 17.4 8.0
Humerus
E 21 148.7 sh 11.9
E 13 B010 152.3 " 11.9 above Mean
1505

94
96.7
2) 190.7 (95.3
10
10

humerus
P13
F 1838
E 486 P13
P67 E 353, P3 E 586
E 428 P61
E 40 P.61 P67 P13 P67 P.77 P61 P75 P13 P13
E 87, E 511, E 162, E 505, E 21, E 418, E 13, E 51, E 43, E 363 P.46
P.13 E 87
K 279-3 Modota E 85 P13 6091 P4 E 487 P67 E 526 P3
6 1970 P34 E 1068 P13 E 503 P.47 E 6841 P4 E 343 P61 E 379 P61

tarsi larger than atalus from Longest
P.3 P.60 P13 (3) 61-67. 36
86.0 83.8 82.7 84.1 80.4
P.14 (86.1) 86.4
P4 88.8
P77 87.2 + 88.7
P2 86.4

CORACOID Table 1

Coragyps occidentalis vs. C. atratus
all sites where available

		RLB	McK	Hachita	Conkl	San Josecito
Length just lateral to internal tip	Max.	69.4	67.5	—	—	65.3
	M	64.4	66.2	64.8	58.9	62.0
	Min.	60.3	63.9	61.0	55.6	55.5
Breadth across triosseal canal	Max.	13.8	13.3	13.1	11.4	13.5
	M	12.2	12.6	12.5	10.7	12.1
	min.	11.3	12.3	11.6	10.3	10.8
Least transverse breadth shaft	max.	9.4	9.1	9.1	7.9	9.8
	M	8.6	8.5	8.5	7.2	8.4
	min.	7.4	8.0	8.0	6.7	7.3
Ratio Br. across triosseal canal.		20.1 19.0 17.8	19.8 19.4 18.5 18.5 4)76.5 19.1 M	18.2	19.2 19.0 18.8	19.1 18.5 17.8	21.6 19.6 18.1

Lengths compared: max. 60% shorter; means 39% shorter; mins. 39%

1 C. oc. (or min.) with range of C. atratus

rel. ratios

Ratio	18	19.1–19.4	19.5–19.9	20	21
Key	IIII	IIII IIII II	IIII IIII III	III	IIII
RLB	IIII II	III IIII IIII	IIII	I	

17 ↑ mean 19.0 — 34 — 39 — 31

20

17

31)200 6 — 39)340 80%
312

165 — 3 — 495 — 150 — 27 — 4095 — 3 — 1228 5

TARSOMETATARSUS C. occidentalis/C atratus

	Greatest length	Proximal breadth
longest		
D7416	88.7	
E 31	87.2	
shortest		
D8939	78.3	
D8293	78.9	
Range in series of 50		
maximum	88.7	
mean	82.9	
minimum	78.3	

RLB Cerrados, Crayfish occidentales

	Length back of tip	br at sleeve trimmed canal	br at the	Ratio br.	Length back of tip	br at sleeve (trimmed canal)		Ratio br
R D8356 P4	64.0	12.3	9.2	19.2	R D9751 P2	63.3	12.1	8.8	19.1
D9074 P3	65.3	12.8	10.0	19.6	D9246 P16	65.2	12.6	8.1	19.3
E173 P13	66.5	13.2	8.4	19.8	D7452 P4	63.5	12.3	8.5	19.4
D9070 P14	64.6	12.9	9.8	19.9	E98 P13	65.1	12.0	8.4	18.4
E587 P13	64.9	12.2	—	18.8	E55 P13	66.1	13.6	9.2	20.3
D9940 P2	65.6	12.3	9.0	18.6	E159 P13	64.7	12.5	8.5	19.3
D7260 P4	65.6	12.7	8.0	19.3	E3 P17	67.0	12.9	9.0	19.2
D9285 P16	66.5	12.5	8.2	18.8	D8885 P3	63.7	13.1	9.8	20.5
D9204 P14	63.9	12.8	9.4	19.9	D8482 P3	66.3	12.0	9.0	18.1
H3881 P13	65.9	12.3	8.8	18.6	D8623 P3	64.3	12.3	8.2	19.1
E432 P61	63.4	12.3	8.4	19.3	D8085 P4	63.0	12.9	8.4	20.5
D8017 P4	64.5	11.9	7.3	17.6	D9869 P10	66.8	12.7	8.6	17.9
D9043 P3	64.8	12.9	8.5	19.8	D7960 P14	66.2	12.2	8.8	18.4
D9275 P14	63.8	12.7	8.0	20.2	H3877 P14	62.4	11.5	7.2	18.4
D8563 P3	66.0	11.9	8.8	18.0	D9312 P16	63.2	11.8	7.8	18.6
E129 P13	66.1	13.2	9.7	19.9	D9608 P14	66.9	12.0	9.3	17.9
E396 P61	63.8	12.1	8.7	18.9	D7120 P4	65.3	12.7	8.4	19.4
D9487 P16	65.2	12.5	8.2	19.2	E471 P67	65.1	12.0	8.8	18.4
D9835 P10	64.2	12.0	8.5	18.7	D7335 P4	65.6	12.6	8.7	19.2
D7898 P4	64.4	12.7	8.6	19.4	D8245 P4	66.7	12.4	8.8	18.4
	1299.5	249.6		393.4		1298.7	248.2		380.0

Coracoids RLB — Copy from list
C. occidentalis measured for Haduta Cave Study [omitting young and broken from original list] 11.1.67

31

	Length inside tip	Br at sigmoid (=trioss. enlarg)	Br shaft below foramen	Ratio trios. to length
D9249 P16	61.2	11.9	8.3	19.8
E259 P13	63.2	12.0	9.1	19.2
D9610 P14	62.3	11.9	8.6	19.1
E321 P13	62.6	11.5	8.7	18.2
D8619 P3	(60.3)	11.5	8.3	19.0
F1849 P3	60.8	(11.3)	7.8	18.5
E198 P13	62.3	11.9	8.2?	19.1
E387 P61	61.6	12.2	8.8	19.7
D722K P4	61.6	11.8	8.7	19.1
D7604 P4	63.1	12.3	9.4	19.4
D7512 P4	63.1	12.2	8.5	19.3
D8849 P3	(61.5)	11.6	8.1	18.8
E543 P67	62.9	12.2	7.4	19.4
D8627 P3	62.4	11.9	8.5	19.1
D8085 P4	63.1	12.7	8.8	20.1
D7027 P4	63.3	12.7	8.2	20.1
D8474 P4	63.0	11.9	9.0	18.9
D8720 P3	62.8	12.0	8.7	19.2
D8380 P4	63.0	11.6	7.5	18.4
D8585 P3	62.9	12.1	8.7	19.2
	1245.7	239.2	20) 384.6	(19.1)
			163	

	Length inside tip	Br across trios. canal	Br shaft below foramen	ratio Br trios. to length
D9257 P14	(69.4)	13.0	8.9	18.7
D9736 P2	66.9	12.6	8.7	18.8
D8185 P4	67.5	12.1	8.3	(17.9)
D9215 P14	67.8	12.3	9.2	18.1
E183 P13	68.6	12.8	8.5	18.6
D7261 P4	67.5	12.5	8.8	18.5
E252 P13	67.0	13.1	9.4	19.5
D7418 P4	66.8 uninat?	(13.3)	8.5	19.8
E674 P14	68.6	12.7	8.9	18.5
D7052 P4	65.9	12.8	8.2	19.2
D7507 P4	65.9	12.4	9.3	18.8
	741.9	139.6	11)	206.5 (18.7
				11
				96
				88
				85

C. atlantis max 60.7 only 1 C. oc (min) within range

3 below mean
38 above mean

20 of these 30 below mean rel br, are above M length

23 of these 38 above mean rel br are below M length

10.16.67

Coraçyps from Caves

S.C. | D.C. | H. | Conkling 26 | Coraçyps from Carlsbad | McKit

*specimen broken below middle	Smith Creek Cave Nevada	Dark Canyon Cave N. Mex	Hachita Cave (& are dig. bones)	Conkling 26	Coraçyps from Carlsbad	McKit
Tarsus length				#28.3 yg only	length #82.1 / Br prox 16.7 / Br dist 17.0 / least sh 7.9 / mid trans 6.8 / 10.6	87.6 / unmat 17.0 / 18.3 / 7.5 / 7.4 / 11.1	84.9 / 17.7 / 18.6 / 8.6 / 7.5 / 12.0	— / — / — / 7.8 / 7.3 / 11.3	84.3 / 17.2 / 18.4 / 8.6 / 7.3 / 11.9	90.4 / 16.8 / 18.7 / 7.5 / 7.1 / 11.8	8.1 / 32.5 / Ratio prox to dist 20.8 / 18.1 / 20.3	Ratio dist to prox 21.9 / 21.8 / 20.7	10.1 / 10.1 / 8.3
Br dist.	17.8 least?	17.2	Br prox (a) 16.4	yg only									
Br sh	7.8	—	yg (b) 4.7										
Dimensions mid trochlea	7.2 / 11.6	7.3 / 11.4	—										
Coracoid				#69 R	#70 R	#71 L							
length	yg fragm 63.7	—	yg fragm 61.+	Broken head 64.8+	—	#65.2 —	—				R 63.9	67.0	66.5	47.5	—	4)264.9 / 2)132.1 / 45507	4.16 / 27
Br. trans.	11.6	—	11.6	12.5	13.1	12.3	13.0	—			12.4	13.3	12.3	12.7	—		
Br. sh below foramen	8.5 R	9.8 Left	8.0 L	8.5 L	9.1 R	8.8 #60	9.6 #63	9.6 #62			8.3	9.4	8.4	8.5	8.3		
Tibia length	—	—	—	—	—	→ 149.0	—				Br dist R 14.1	L 14.1	R 15.7	R 14.1	Br prox R 9.7	14.6 / 4)358.4 / 89.6	
Br. sh		near mid 9.4 least is more distal	least 9.6	Br. dist incomplete	→ 9.0 #34 Broken dist	→ 9.6 #27 Dist Br	8.3 #30	#28	#26	#29	8.8 L immat 11.0	L	R 10.0	9.0	—		
Humerus ext to int tub.		29.8				Length → 148.0	27.5				31.+	30.2	32.8				
Br. prox						least sh 11.6	→ 11.2	11.3	11.2	11.9	11.9	11.6					
Ulna br prox			18.7 middle	Broken ext 18.+		#45 18.0	#153	#44 17.8	#43 —	#41 —	#87 —	no # 18.1					
Br sh.		Below mid 8.4	9.5			—	9.2	8.7	8.3	8.5	8.8	9.8					
Dept ext crest		13.4 2nd specimen 14.7							13.9	—	—						
" " "					Length →	176.8	—	—	162 without olecran	—	—	178.9					
Carpo Length	—	—	—	—	—	#59 84.5	#55 —	#57 —	#56 —	#58 —	#172 frg	—			—		
Br trach			10.3			10.8	10.1	—	—			—			9.8		
Br Mc	—	—	—	—	—	8.5	8.5	8.4	8.7	8.4	8.7	9.0	8.8	8.0	8.5	7.7		8.9
Depth Mc I						21.9	21.7	—	—	—		—			—		
Femur Least Br shaft						no # 10.4	#67 10.0	#66 10.3					R 11.0	L 11.4			
Br dist	—	—	—	—	—								24.3	24.9			

Corkeley Canem

Coracoids

Humerus ① aver of RLB in length & br.
Thus (nic.) aver to aver max. br.

Carpus Two above aver RLB

Femur three br. shortly all above aver RLB

Tibia one above aver RLB in length, & br. prox near aver (slightly below) in br. distal aver in br. shaft

Tarsus minimum length of RLB under min in dist br. slightly over min in br & sh within C. atratus in all actual meas. but exceeds atratus in rel. br. of dist & shaft (marked in the table)

McK & Calf.

McK
1 exceeds RLB max in length
2 are a bit above & aver. length.
All have prox br. above atratus aver or either for RLB.

Calf.
1 aver length } of RLB
1 near max
Prox br. greater than atratus (& M) aver or under RLB prox & shaft br.
& dist br.
rel. br prox & dist greater than atratus

San Josecito Cerapyhs

Tibia

Ulna

Carpometacarpus

	Length to articular	Br prox	Br dist articular	Br shaft	Ratio dist Br to length	Ratio shaft Br to length		Length to sternal or length	Br prox	Br shaft mid	Ratio Br to length
(5) R	143.9	—	14.0	8.6	9.7	5.9		160.2		9.1	5.6
(2) R	139.3	17.9	14.0	8.9	10.1	6.2	R	160.3	17.1	9.1	5.6
(1) R	139.1	—	13.6	8.3	9.9	5.9		161.4	16.4	8.1	5.0
(B) R	139.6	17.0	13.3	8.0	9.5	5.7	L	161.9	17.8	8.7	5.3
(3) R	140.6	16.3	12.9	8.5	9.1	6.0		170+	16.5	8.8	5.1
(4) R	141.4	16.7	13.3	9.2	9.4	6.5		165+	17.4	9.0	5.4
R	142.9	—	13.3	9.2	9.3	6.4	R	159.4	16.7	8.3	5.1
R	130.5	—	—	9.5	9.8	5.7	R	163+	16.7	8.9	5.4
(6) R	140.0	—	13.3	8.2	9.5	6.4	R	167.0	—	9.1	5.4
R	138.0	17.5	13.6	9.1	9.8	6.6					
(3) L	139.6	17.7	13.6	8.5	9.7	6.1	L	160.0	15.5	8.0	5.0
(8) L	145.1	—	13.3	8.6	9.1	5.9		163	—	9.0	5.5
(4) L	141.2	—	13.9	9.2	9.8	6.5		160+	15.6	8.1	5.0
(6) L	142.4	—	13.3	8.3	9.3	5.8	L	165.0	16.0	7.7	4.6
(1) L	138.7	—	13.5	9.8	9.7	7.0	R	155.5	16.3	8.1	5.2
(7) L	141.4	17.7	—	9.2	—	6.5	R	164.0	17.5	9.0	5.4
(5) L	142.0	—	14.1	9.2	9.8	6.4	R	164.5	16.8	8.2	4.9
L	137.6	—	13.9	8.4	10.1	7.3	R	155.1	16.0	8.4	5.4
							R	167+	—	8.9	5.3
							R	160.2	16.5	8.3	5.2
							R	165.6	16.4	7.8	4.7

	Length to M2	Br trochlea	Depth M1 process	Br shaft mid	Ratio Br to M2 length
L	76.4	9.2	—	8.1	10.6
L	80.7	9.7	20.8	7.6	9.4
L	76.6	9.2	19.8	8.2	10.6
L	79.6	9.5	21.3	8.4	10.5
L	77.7	9.5	19.7	8.25	10.5
L	77.5	9.4	20.4	8.6	11.0
L	78.4	8.8	20.0	9.3	11.9
L	76.0	7.8	19.9	8.1	10.6
L	78.4	9.3	20.6	8.4	10.7
L	75.9	9.5	20.4	8.4	11.3
(8) L	79.9	9.3	20.2	7.9	10.1
(1) R	81.2	9.8	20.4	8.5	10.4
(3) R	77.7	9.7	20.1	8.5	10.9
(2) R	79.6	9.0	20.1	8.4	10.5
R	75.8	9.4	—	8.9	11.5
R	77.1	9.0	20.4	7.9	10.2
R	74.1	9.0	19.0	7.8	10.5
(4) R	76.7	9.0	20.1	8.2	10.7
(4) R	76.4	8.8	18.8	8.0	10.4
L	80.3	—	—	9.2	11.4
L	81.2	—	—	8.5	10.4

Little Hatchet and Los Coagyus

Ceracoid

	yg	ad.	
wt length	61.0	64.8	[illegible]
br at glenoid	11.5	12.5	12.8
depth sh	7.9	8.8	9.1

Ulna

br prox	18.8	17.7
br dist	9.4	—

R tarso

br prox	16.4

Hachita

Tibia	
br dist	br sh
14.8	9.7

carpus
br trochl
10.3

Eagle tarso

depth gr. br	27.8
br of condyles	23.5
Depth ext cond	16.0
Depth ext cond	15.1
Br middle cond	8.3

Carlsbad Rat

	Length	prox	dist	sh	prox	dist	br
1941 Rt tarso	87.8	16.9	17.9	7.6	19.2	20.4	8.4
Rt	82.1	16.6	16.8	7.9	20.2	20.4	9.6
		+ two			+ two		
Coracoid Rt	54.6	11.3	—	8.3	20.7	—	15.2
left	—	11.9					

Rt 8,96

Coagyus coracoid

	gr length	dem length	brac of humer	br sh
imm.	62.6	60.8	11.6	(7.9)
ad	—	64.7	12.6	8.7
very yg	—	60.9	(11.4)	8.9
ad?	—	—	13.1	9.1
Watrous N.M	—	60.6	11.9	8.6
c. atlatus 1360	56.7	55.3	10.4	6.6
228	61.8	60.4	11.1	7.2
716	59.6	58.9	10.5	6.8
1739	62.4	(60.6)	11.4	(7.8)
R&B, Dunlevy	61.5?	60.6	(11.5?)	8.3
	—	61.0	11.2	(7.8)
		61.2	11.9	8.3
		61.5	11.6	8.1
Target	70.8	69.4	13.0	8.9
	69.9	68.6	12.8	8.5
	69.6	68.6	12.6	8.9
	69.9	67.1	13.3	8.5

Tgw sewes C. ex. mex USE
Taurus
San Jacinto

10.26.67

20 taxi referred [use including type]

	qp dusty	mex	sh	dust	rate per sh	T	dia 18
10	73.5	16.8	8.1	—	22.8 11.0	Left	
1	77.4	15.10	7.9	—	20.1 10.2	1	138.8
2	77.0	15.7	7.6	16.2	20.3 9.8	2	140.9
3	77.3	15.7	7.5	16.3	20.3 9.7	3	139.7
4	76.8 broken up	16.0	7.5	16.7	20.4 9.7	4	141.3
5	79.3	17.2	8.4	17.7	21.7 10.6	5	142.1
6	78.8	16.2	7.7	16.5	20.6 9.7	6	142.3
7	81.4	16.8	8.6	17.5	20.4 10.5	7	141.4
8	83.5	—	7.6	—	— 9.1	8	145.1
9	81.9	16.7	7.6	17.6	20.4 9.2	Right 3357	137.9
10	83.3	16.3	—	18.1	19.4 —	1	139.8
Right 1	77.7	16.4	7.8	16.6	21.1 10.0	2	139.4
2	77.8	16.2	7.8	16.4	20.8 10.0	3	140.1
3	80.1	15.5	7.6	16.1	19.3 9.4	4	141.4
4	80.7	15.7	7.8	16.2	19.4 9.6	5	143.9
5	82.5	15.5	6.8	16.7	18.7 8.2	6	139.9
6	82.0	16.5	7.8	16.8	20.1 9.5	7	142.7
7	81.6	16.8	8.3	17.1	20.6 10.1	8	143.1
8	82.1	15.6	7.5	—	19.0 9.1	Left 9	~~137.0~~
9	83.2	—	7.3	16.3	18.7 8.7	18) 2536	140.9
10	83.4	15.6	—		18.7 9.6		

	dusty	mex	sh	dust	rate per sh	sh rate	
RT' mended new							
1	139.1	—	25.3	11.5	8.2		
2	133.7	—	24.9	11.3	8.4		
new 3	136.9	27.8	25.4	11.1	8.1		
4	136.3	30.2	26.3	11.4	8.3		
5	143.5	—	26.0	11.6	8.0		
✓ 6	146.5	30.6	27.0	11.7	7.9		
✓ 7	145.3	—	27.3	11.7	8.0		
3352	148.2	31.1	26.5	11.1	7.4		
Left mended new 1	144.5	—	26.1	11.8	8.1		
✓ 2	139.7	29.6	26.2	12.0	8.6		
surface 3	138.6+	—	—	crashed 12.6?			
✓ 4	144.3	—	27.3	11.7	8.1		
✓ 5	146.0	—	26.3	11.6	7.5		
✓ 6	145.8	31.6	27.4	11.7	8.0		
✓ 7	146.4	30.2	—	11.9	8.1		
✓ 8	148.5	31.6	28.9	12.3	2.9		
15) 2134	511.6	31	370	173	120		
	142.3	30.3					

USE

	dusty	mex	sh	dust	rate per sh	sh rate	
1	139.1	—	25.3	11.5	8.2		
2	133.7	—	24.9	11.3	8.4		
3	136.9	27.8	25.4	11.1	8.1		
4	136.3	30.2	26.3	11.4	8.3		
5	143.5	—	26.0	11.6	8.0		
6	146.5	30.6	27.0	11.7	7.9		
7	145.3	—	27.3	11.7	8.0		
3352	148.2	31.1	26.5	11.1	7.4		
1	144.5	—	26.1	11.8	8.1		
2	139.7	29.6	26.2	12.0	8.6		
surface 3	138.6+	—	—	crashed 12.6?			
4	144.3	—	27.3	11.7	8.1		
5	146.0	—	26.3	11.6	7.5		
6	145.8	31.6	27.4	11.7	8.0		
7	146.4	30.2	—	11.9	8.1		
8	148.5	31.6	28.9	12.3	2.9		
15) 2134	511.6	31	370	173	120		
	142.3	30.3					

USE

of Alemora

		sh	rate sh
Left 1	86.9	10.2	10.7
2	88.0	10.1	11.5
3	89.6	10.3	11.5
4	87.5	10.5	12.0
5	91.0	10.2	11.2
6	93.6	10.3	10.9
7	93.1	10.3	11.0
8	92.9	10.3	11.1
9	93.6	10.0	10.6
RT 10	85.5	8.8	11.4
1	88.2	9.5	10.7
2	88.4	9.6	10.8
3	93.1	10.2	10.9
4	89.8	9.4	10.4
5	89.3	10.2	11.4
6	91.9	9.4	10.2
7	90.1	10.0	11.1
8	90.5	9.6	10.6
9	90.4	11.4	12.6
10	91.8	9.5	10.3
11	92.9	10.0	10.8
12	90.3	9.5	10.5
13	91.4	9.9	10.8

San Joaquin Type material

10.30.67	20 Ulna gr length to olecranon	Br at middle	USE Br prox corner	Ratio					Calcaneus 2/calc	USE Br at middle M2	Br at middle	90 breadth M2										Caracoids see 12th list 21+17=38			
Lefts 335'6	161.4	8.7	12.7	5356				Lefts																		
1	160.4	8.9	—	5.5				1	78.7	8.5	8.9	10.7														
2	160.1	8.2	15.6	5.1				2	80.8		8.9	—														
3	167.0	9.0	—	5.3				3	80.7	9.2	—	11.4														
4	160.1	8.1	—	5.0				4	77.7	8.3	9.2	10.6														
5	165.0	7.7	—	4.6				5	78.6	8.4	9.2	10.6														
Rights 6	164.a	8.9		5.4				6	79.6	8.3	9.5	10.8														
1	159.6	8.3	16.6a	5.2				7	75.9	8.1	8.8	10.6														
2	163.3	9.1	17.4	5.5				8	78.0	8.0	9.2	10.2														
3	155.4	8.0	16.2	5.1				9	79.8	8.3	9.5	10.3														
4	160.2	9.1	—	5.6				10	76.0	8.6	9.1	11.3														
5	155.1	8.3	16.0	5.3				11	76.7	8.3	9.1	10.8														
6	171.0	8.7	17.4	5.0				12	78.9	8.3	9.6	10.6														
7	165(a)	8.8	16.4	5.3				Rights 1	81.1	8.5	9.8	10.4														
8	160.3	8.3	16.8	5.1				2	79.6	8.4	9.1	10.5														
9	164.6	8.3	—	5.0				3	77.7	8.5	9.9	10.9														
10	156.1	8.5	—	5.4				4	76.3	8.0	8.8	10.5														
11	165.5	7.8	16.4	4.7				5	77.2	8.0	9.0	10.3														
12	161.2	8.2	—	5.0				6	76.7	8.2	9.1	10.6														
13	160.7	7.9	—	5.4				7	74.0	7.8	9.0	10.5														
20	126.5	1.6						8	77.4	9.2	—	11.8														
161.8	20	8.4	16.6					335'5	77.1	8.0	9.0	10.3														

San Joaquin Curassow — Crax — Tinamou

Cracidae — USF

	South Inter. tip	Br trio	least Br. sh. below foramen	Ratio tip br.		R → Left					Length	Br max	Br sh	Length / Br sh Ratio	br med track depth mid toe	Ratio Br sh	ratio br max	
Right	~~52.2~~ unsexed	~~10.6~~	~~8.6~~	~~19.5~~		R	65.3	12.2	~~8.4~~	18.7		73.5	16.8	8.1	~~22.8~~		11.0	22.7	TYPE ?
	61.9	12.1	8.6	19.6		Left	61.0	12.0	9.1	19.6		81.8	16.9	7.4	20.6		9.0		
X ✓	59.4	12.5	8.5	21.0		Y	61.0	12.0	9.1	19.6		82.4	15.6	6.8	18.9		8.2		
X ✓	59.8	18.5	8.4	19.2			64.0	12.4	8.5	19.3		81.4	16.9	8.3	20.7		10.1		
	63.8	12.3	8.6	19.2			63.8	11.7	8.3	18.3	✓	78.8	16.1	7.6	20.4		9.4		
—	60.7	12.2	8.0	20.1			~~61.2~~ unsexed	~~11.8~~	~~7.5~~	—	✓	77.3	15.7	7.4	~~20.3~~		9.5		
○	62.0	12.6	8.3	20.3			~~61.9~~	~~11.2~~	~~7.3~~	~~18.1~~	✓	77.7	16.1	7.8	~~20.7~~		10.0		
	63.3	12.7	8.2	20.4		X	61.4	11.9	8.1	19.4		79.7	16.7	7.5	20.9		9.3		
— ○	62.4	12.0	7.7	19.3		○	62.7	12.0	8.3	19.1	✓	77.6	16.3	7.8	~~20.9~~		10.0		
— ○	62.0	12.2	8.2	19.7		X	61.6	12.0	8.3	19.3		81.5	15.9	7.9	19.5		9.6		
all other Cur1 below Mean = Mean or.	59.6 mean sexes	10.8	8.0	18.1		○	62.8	12.4	8.3	19.7		80.3	15.7	7.8	19.5		9.7		
X	64.4	12.4	8.9	19.2		✓	59.5	12.5	8.0	21.0		81.4	16.6	8.3	20.4		10.4		
	63.8	12.7	8.7	19.9		○	62.9	12.2	8.6	19.4	✓	77.0	15.7	7.5	~~20.4~~		9.7		
X ✓	59.4	11.7	8.5	19.7		—	60.8	11.9	8.5	19.6		79.2	17.1	8.4	21.5		10.5	20.1	
— ○	62.5	12.0	9.0	19.2			63.7	13.5	8.5	21.1		82.0	15.7 inc	7.6	19.1		9.2	20)402.5 40	
— ○	62.4	12.3	9.6	19.7			58.5	11.2	7.5	19.1		83.2	16.6	7.4	19.9		8.9		
—	60.5	11.8	9.1	19.5		—	60.7	13.2	9.8	21.6	✓	77.4	15.6	7.7	20.1		10.0		
—	60.4	12.2	8.16	20.2			61.0	12.0	8.4	19.6	~~✓~~	83.5	inc	7.5	—		8.9		
X 3354	64.2	12.6	8.6	19.6			64.8	12.8	8.5	19.4		80.0	15.6	7.6	19.5		9.4	9.9	
— ○	62.8	12.0	9.1	19.1			64.3	11.8	7.8	18.4	✓	79.2	16.0	7.4	20.7		9.6	21)201.3 189 193	
X	61.7	12.1	7.8	19.6		○	62.0	12.7	8.5	20.4	3358	79.7	15.1	7.0	19.1		8.7		
61.8	20)1237.0 120	24)487.7	1704	392)1476		62.1	1244.2	24)488.3	1587	371)1473	79	1592.8	(79.3 1530.7	1539	405.5	21)	201.83	.2	

(Top-left scratch: 244.3 / 242.2 / 49)486.0 (2.1 — 305.7 / 16.8 / 20)322 / 39 / 120 / 25 — 79.6 / 1592.8 / 140 / 192 / 180 / 12 — 1592.8 / 735 / 25)1666 / 198 / 196 / 189 — 15.1 / 19)305.7 / 19 / 115 / 114 / 1.7)

(Mid-left scratch: 1237.9 / 1244.2 / 40)2481 / 240 / 81 / 2.2 (62.0 — 170.4 / 158.7 / 39)329.1 / 312 / 17 (8.4 Ratio br trio)

(Mid scratch: 3924 / 371 / 39)97.4 (9.4 — 3977 / 39)373 / 37 / 3 / 39 / 3 / 3 / 3 / 0)

(Bottom-right scratch: 20.1 / 20)402.5 / 40)

Sept 24, 1967 Coragyps San Joseeto — Humerus — Femur

Taurus

		gr length	br prox	br dist	least br sh.	Ratios to length: prox	dist	sh		Hum Ratio dist to length	gr length	prox across ext. wing tube	dist	least sh br	Ratio br sh to length %	Ratio prox to length	Femur from artic. ext. (length)	br dist	br sh	Ratio sh to length: dist	sh
Rights	⑦	80.6	15.7	16.2	7.7	19.4	20.0	9.5		17.8 R	148.2	31.1	26.3	11.1	9.4	21.0 R	94.7	22.4	10.6	23.6	11.4
	⑪	82.4	15.7	16.6	6.8	19.0	20.0	8.2		19.0 L	144.3	30.4+	27.5	11.4	7.8	21.0 L	90.1	—	10.1	—	11.3
Tyro	4a	77.6	16.1	16.3	7.8	20.8	20.9	10.0		18.1 L	146.1	—	26.4	11.0	7.5	— R	89.6	—	10.3	—	11.4
	⑩	82.0	15.5	—	7.6	18.9	—	9.2		19.1 L	139.6	29.8	26.7	11.5	8.2	21.3 R	90.6	22.9	9.8	25.2	10.8
	④	77.6	16.4	16.6	7.7	21.1	21.8	10.0		18.9 L	148.5	31.3	28.1	11.8	7.9	21.0 R	90.3	22.0	10.1	24.2	11.2
	4a	81.5	16.9	17.1	8.2	20.7	20.9	10.0		[illegible] L	146.4	30.2	—	11.7	7.9	20.6 R	89.7	21.2	9.8	23.6	10.5
Left	②	77.1	15.6	16.1	7.6	20.2	20.8	9.8		18.8 L	145.8	31.8	26.8	11.7	8.0	21.8 L	92.9	22.7	10.4	24.4	11.2
	⑨	81.9	16.7	17.6	7.4	20.4	21.4	9.2		18.0 R	133.4	—	24.6	11.3	8.4	— L	85.6	20.4	9.8	23.8	11.4
—	3a	77.4	15.6	—	7.9	20.1	—	10.2		18.8 R	145.1	—	25.0	11.5	7.9	— L	90.5	22.0	9.7	24.1	10.7
	⑥	79.07	17.1	17.6	8.2	21.6	22.0	10.3		18.5 R	146.8	30.2	26.5	11.7	7.9	20.6 L	93.6	22.3	10.0	23.8	10.7
	③	77.2	15.7	16.2	7.4	20.3	21.0	9.4		16.76	144.39	21.48	24.3	11.47	7.87	14.73	93.2	22.2	10.5	23.8	11.2
	⑤	78.7	16.1	16.3	7.6	20.4	20.6	9.6				30.6	26.9			21.0 L	89.9	—	10.0	—	11.1
	⑧	81.4	16.6	17.1	8.5	20.4	20.8	10.4								R	92.9	22.1	10.0	23.8	10.7
	①	fracture 76.5+	16.0	16.4	7.4	20.9	21.4	9.6			1.133					R	92.9	22.3	10.2	24.0	10.9
	⑫	83.5	15.3	—	—	18.3	—	—			1.139					R	91.9	21.9	9.6	23	10.9
											1.144					R	91.3	—	10.2	—	11.1
											2.145					16)	145.97	24.4	10.8	28.1	11.0
											3.146										
											2.148										

av. 79.6

16.0

17.2

7.7

20.12

21.7

12.6

10.6

91.2

14 × 9.7 = 90.4 unrecorded = 191.1

10.1

24.0

C. occidentalis vs C. atratus ULNA

	Greatest length	Breadth proximal	Breadth shaft prox.	Br. Sh. pap. 6	Depth sh pap. 6	Ratio prox. to length
D7165 (max. length)	180.0	18.0	8.4	8.7	8.6	
D8300 (min. length)	156.8	17.5a	8.2	8.5	8.4	
Mean of 11	165.3 (157.8)	17.5	8.3			
max of 4 (means in series)	180.0 (161.3)	18.3	9.0	8.9	8.1	
min of 4	156.8 (145)	16.7	7.6	8.2	8.9	

C atratus max 166.3
4 birds aur. 157.8?
min. 145.0

Hachita cave — 18.5 8.2

Conkling Cavern #43 169.1 17.8a
H 42 160.8 juv. —
H 45.46 176 18.0

CORACOID

Measurements and ratios of Coracoyps occidentalis and C. atratus

RLB	Length to ~~sternal border medial to~~ internal tip	Length to sternal border back of tip to articular joint	Breadth below head across triosseal canal	Breadth shaft (least)	Ratios to length ~~tip~~ Breadth triosseal	Ratios to length ~~tip~~ Breadth shaft
Specimens of maximum length						
D9257	~~69.4~~	70.8	13.0	8.9	~~18.7~~	~~12.8~~
E 183	~~68.6~~	69.9	12.8	8.5	~~18.6~~	~~12.3~~
Specimens of minimum length						
D8619	~~60.6~~	61.5	11.5	8.3	~~18.9~~	~~13.6~~
~~F1849~~ D9249	~~61.0~~ 62	61.6	~~11.2~~ 11.9	~~7.8~~ 8.3	~~18.3~~	~~12.7~~
Maximum measurements and ratios of ~~30~~ 22 specimens	69.4	70.8	13.3	9.4		
Minimum measurements and ratios of ~~30~~ 22 specimens	~~60.6~~	61.5	11.~~2~~ 3	7.4		
Mean measurements and ratios of ~~30~~ 22 specimens	64.0	65.~~8~~	12.~~4~~ 2	8.~~8~~ 6		
RECENT						
C. atratus						
LACM 1739 (max. length	~~62.6~~	62.6	11.~~4~~	7.~~9~~		
LACM 1360 min. length	~~56.8~~	56.7	10.4	6.7		
Mean of 6		60.~~4~~	10.7	~~8~~.2		
mx. of 6		62.6	11.4	7.9		
min. of 6		56.7	10.3	6.7		
Cowbird Canon #69		66.9	11.7	9.0		
#70			12.1	9.5		
Hasbrita yg, bone		gr. length less				
		yg 60.4	11.5			
		min 62.~~6~~ (60.8)	11.6	7.9		
		65.5	11.6	—		
		64.8	12.5			
		70.2	13.0	—		
Wetmore's record		M ~~64.7~~ 65.5	~~60.4 11.9~~	~~8.4~~		
Hasbrita contd		—	60.9 11.4	8.9		
" "		—	64.7 12.6	8.7		
" "		— —	13.1	9.1		
			M 12.1	M 8.6		
Mekiti	63.7-67.5		12.3-13.1	8.0-9.1		
	M 66.1		M 12.5	M = 8.5		
Carpinteria	54.4		11.3	8.3		

When did I get this? I meas'd it! 1962

Measurements of Pleistocene and Recent Coragyps

(measurements in millimeters, ratios in percent)

TABLE 1

Coracoids

		C. atratus	RLB (70)	McK (4)	SCC (1)	C C (3)	H C (2)	SJC (38)
Length head to sternal facet	Max.	60.7	69.4	67.5			64.8	65.3
	Mean	58.9	64.5	66.2	63.7	65.2		62.0
	Min.	55.6	60.3	63.9			61.0	58.5
Breadth across triosseal canal	Max.	11.4	13.6	13.3		13.0	13.1	13.5
	Mean	10.7	12.3	12.6	11.6		12.5	12.1
	Min.	10.3	11.3	12.3		12.3	11.6	10.8
Ratio breadth to length	Max.	19.1	20.5	19.8			19.2	21.6
	Mean	18.5	19.0	19.1	18.2	18.8		19.6
	Min.	17.8	17.6	18.5			19.0	18.1

TABLE 2

Humeri

		C. atratus	RLB (52)	McK (3)	~~SCC~~	C C (7)	H C	SJC (15)
Greatest length	Max.	142.2	155.9					148.5
	Mean	135.4	148.5			148.0		142.3
	Min.	124.8	142.6					133.4
Breadth proximally across ext. and int. tuberosities	Max.	27.9	32.4	32.8				31.8
	Mean	26.4	30.6	31.0		30.3		30.3
	Min.	24.7	28.5	30.2				27.8
Breadth distal end	Max.	25.7	29.1					28.1
	Mean	24.2	27.4			27.5		26.4
	Min.	22.5	26.1					24.9
Least Breadth shaft	Max.	10.8	12.4			11.9		12.0
	Mean	10.1	11.5	11.0		11.4		11.5
	Min.	9.5	10.8			11.2		11.0
Ratio shaft br. to length	Max.	8.1	8.5					8.6
	Mean	7.4	7.7			7.9		8.0
	Min.	7.0	7.2					7.4

Ratios for radius added

10.1.67
(second arrangement)

Table 1
Distinguishing characters of Coragyps and Cathartes

	Coragyps	Cathartes
Scapula	acromion prominent (protruding equally to glenoid facet, in side view)	acromion lacking in prominence (less prominent than glenoid facet
Coracoid	scapular articulation a noticeable depression	scapular facet convex but indistinctly defined
Humerus	shaft well curved deltoid crest terminating near external edge of shaft (at its distal tip)	shaft straighter deltoid crest slanting medially, terminating in a small convex papilla in center of shaft (anconal side)
Ulna	olecranon pointed external cotyla without raised border muscle scars below cotylae not well defined carpal tuberosity	olecranon more blunt external cotyla with raised border muscle scars below cotylae heavily bordered carpal tuberosity
Radius	Ligamental papilla (proximally) not well developed Foramen at distal end large and single Proximal foramina marked	Proximal ligamental papilla prominent Distal foramina either numerous and small, or absent proximal foramina less marked
Carpometacarpus	Proximal symphysis short (32.9-37.5% of length) Metacarpal 3 rounding into metacarpal 2 at distal symphysis, not raised above M2	Proximal symphysis long (35.4% of length) Metacarpal 3 raised above distal end of metacarpal 2 at distal symphysis
Femur		
Tibiotarsus	Inner cnemial crest more prominent anteriorly, but of less extent distally	Inner cnemial crest less prominent but extending farther distally
Tarsometatarsus	Shaft narrower but deeper	Low intercotylar prominence, Shaft relatively broad and shallow

10.1.67
1st arrangement

Distinctions of Coragyps from Cathartes

Scapula
Cathartes, glenoid facet more prominent than acromion
Coragyps, both protrude about equally (in side view)

Coracoid
Cathartes, scapular facet indistinctly defined, but convex
Coragyps, scapular articulation a noticeable depression

Humerus
Cathartes, shaft straighter; deltoid crest slants medially, terminating (distally) in a small convex papilla in the center of the shaft on the anconal side.
Coragyps, shaft well curved; deltoid crest terminates near external edge of shaft

Ulna
Cathartes, shaft stout; olecranon more blunt; external cotyla with raised ulnar border near intercotylar region; muscle scars below cotylae heavily bordered; carpal tuberosity (distally)

Coragyps, shaft more slender; olecranon pointed; external cotyla without raised border; muscle attachments below cotylae not well defined; carpal tuberosity

Radius
Cathartes, prominent ligamental papilla (proximally); foramina both proximally and distally either small or absent; shaft more curved.
Coragyps, Ligamental papilla less well developed; foramen at distal end large, foramina at proximal end more marked than in Cath. shaft less curved.

Carpometacarpus
Cathartes, proximal symphysis longer; metacarpal 3 raised above distal end of metacarpal 2 at distal symphysis.
Coragyps, proximal symphysis shorter; metacarpal 3 rounds gradually into metacarpal 2 at distal symphysis, not raised above M2.

Femur
Cathartes

Coragyps

Tibiotarsus
Cathartes, inner cnemial crest less prominent but extending farther dist'ly
Coragyps, inner crenila cre t more prominent anterior, but of less extent distally

Tarsometatarsus
Cathartes, low intercotylar prominence, shaft relatively broader transversely, shallower anteroposteriorly
Coragyps,

~~For the skeleton~~

It should be ~~noted~~ mentioned that in some dimensions and/or proportions the turkey vulture, Cathartes aura resembles Coragyps occidentalis. ~~Unfortunately~~ ~~since comparative material, even~~ Recent species ~~is not always at hand, the following brief~~

~~analysis~~
~~Suffice it, however~~ Cathartes & Coragyps are ~~sometimes~~ readily distinguishable. ~~See table.~~ ~~If comparative material is not at hand the following brief analysis of images~~ should ~~be~~ ~~instructions~~ suffice to

Reeve (orig. #'s) 17

Coragyps occidentalis mexicanus n. subsp.

Holotype: Left tarsometatarsus lacking external distal condyle; LACM no. 20455 collected by Calif. Institute of Technology.

Age and Locality: Late Pleistocene, San Josecito Cave, province of ~~Aramberri~~ Zaragoza, state of Nuevo Leon Mexico; Calif. Inst. Tech. loc. no. 192.

Diagnosis of holotype: Compared to type of Coragyps occidentalis from from Rancho La Brea (Univ. Calif. Mus. Paleon. no. 12509), 11 per cent shorter (89%); 10 per cent greater in proximal breadth relative to length; 14 per cent relatively stouter of shaft. Compared to the series of tarsometatarsi from Rancho La Brea (Table 7), 6 per cent shorter than minimum (94%), but 4 per cent greater than maximum in relative breadth of proximal end and stoutness of shaft.

Measurements of type: Greatest length, 73.5 mm.; greatest breadth of proximal end, 16.8 mm.; least breadth of shaft, 8.1 mm.; breadth of proximal end relative to length, 22.8 %; breadth of shaft relative to length, 11.0%.

Referred material: With the type, the following additional specimens constitute the type series

20 tarsometatarsi (LACM 3358 and 20307 - 20326)

41 coracoids (LACM 3354 and 20327 - 20363)

15 humeri (LACM 3352 and 20364 - 20377)

20 ulnae (LACM 3356 and 20378 - 20396)

21 carpometacarpi (LACM 3355 and 20397 - 20416)

24 femora (LACM 3353 and 20417 - 20438)

18 tibiotarsi (LACM 3357 and 20439 - 20454)

Maximum, minimum and mean measurements and ratios of these elements (with type included) are presented in tables 1-7. In addition to these fully formed bones, the Mexican assemblage contains an equal, or greater number of imperfect and immature specimens that cannot be accurately measured; these presumably represent the same racial group.

in C. atratus. In the present series, the mean is almost the same in the two species (C. occidentalis 99.7 % of C. atratus). Even more noteworthy is the fact that six of the fossil tarsometatarsi exceed the maximum of the Recent form in length, with a maximum difference of 103 %. Relative to the other limb bones, however, both the tarsometatarsus and tibiotarsus are shorter in the fossil species. Table 8 demonstrates some of these relationships in the two species, comparing maximums, minimums and means of length of each element. Particularly notable is the fact that in the Recent species the tibiotarsus is longer than the humerus, whereas in the fossil form the humerus is longer.

All the fossil limb bones average relatively stouter than in C. atratus. This distinction is most notable in the tarsometatarsi where 100 % of the fossil bones exceed the mean of the Recent series in both relative and actual breadth dimensions. In the tibiotarsi, 100% average actually and relatively broader across the distal condyles and 88 % average relatively broader of shaft. In the humeri 98% have a relatively greater proximal breadth/than the mean of C. atratus, and 80% average/broader of shaft; in the ulnae, 96% average relatively broader of shaft, in the femur, 61% and in the carpometatarpus 60%.

	tarsus	tibia	femur	humer	ulna	carp.	cora.
Number of longer than max. of C.at.	6 (9%)	35 (45%)	65 (100%)	52 (100%	(100% 84%	(94%	(100%
	9%	45%	100%	100%	100%	94%	100%
No. rel. broader shaft than max.	83%	80%	40%	11.5%	72%	47%	47%
no. longer than mean	46%	83%	100%	100%	100%	98%	100%
no. broader than mean	100%	88% 100%	61%	80%	96%	60%	78%

Coragyps occidentalis RLB (from old notes)

CORACOID RLB C3 Cones 1968 Hacienda Cuesta/

Length (6 bones) 65.5-70.2
Br, sh 5 " 8.4- 9.6 (ratio to length 12.1-13.7%
Br. at glenoid (5) 11.2-12.5 " " " 17.0-18.0
13.3 (~~Cathartes~~ aura fem) Rather Hacienda stud

(Recent C. atratus 6 bones)
Length 56.7-62.3
Br. sh. 6.7 7.9 ratio 11.4-12.0
Br. glenoid 10.3-11.4 " 17.1-19.5

HUMERUS C. occidentalis larger in all dimensions

Length (24 bones)	154.9	-143.8	(mean 148.1)	C. occidentalis
	142.0	133.3		C. atratus
Dist. br.	29.1	25.7		C. occidentalis
" "	24.9	23.4		. atratus
Br. shaft	11.0	12.8		C. occidentalis
" "	10.8	10.1		C. atratus
Br. prox.	32.5	29.3		C. occidentalis
" "	27.9	27.1		C. atratus

of C. ocidentalis
Humerus/overlaps Cathartes aura in size; distinguished therefrom
1. C. occidentalis more curved shaft

ULNA

Length	180.0	-156.8	(mean 165.3)	C. occidentalis
	161.1	151.5	" 157.8	C. atratus
	184.0	171.7		Cathartes aura

C. occidentalis distinguished from Cathartes: olecranon more pointed; shaft just below proximal end never broader than shaft at middle (may be broader in Cathartes); carpal tuberosity (distally) less prominent in Coragyps.

Br. proximal end	32.5	-29.3	C. occ.
	27.9	2711	C. atratus

FEMUR

Length	101.9-	87.5	C. oc
	87.3	83.9	C. atratus
Least br. sh.	11.0 -	9.6	C. oc.
	10.0	8.9	C. atratus

Also longer than Cathartes aura.

TIBIA	153.0		
Length	~~150.9~~	- 138.2	C. oc. (mean 145.8)
	146.6	140.0	C. atratus
Br. dist.	~~14.9~~		
""	14.8	13.7	C. oc.
" "	13.2	12.8	C. atratus

Coraggyps material

Conkling Cavern — most abundant of all species; only says "in great numbers" (not recorded in detail)
80 bones

Smith Creek Cave — 1 frag. tarsometa (1935 p. 207)
another spec. recorded 1952 (no comment on character)

Hackita Cave — 2 ♀♀ (1 yg) only furcula characters noted
1962 only 1 coracoid (9250 RLB) as short as the humerus coracoid from Hackita, second as slender.
2 adult coracoids within size range of C. occ. in all dimensions
coracoid, tibia, tarsometa as 'ex libris' considerably greater breadth char. of the Pluto sp. as noted in a series of bones in the RLB coll at Lacon.

Dark Canyon Cave — unrecorded cave
10 bones (= 3 or 4 yg) (3 indivs
all adult?)

Rocky Arroyo "is Coraggyps atratus" a coracoid
" marks extension of range for that species"
[Extended historically most of century, none in N. Mex.]
doesn't say whether in deep level or with
Bachat Maker.

? San Josecito

Potter Creek Cave, Shasta Co. 8–15 indivs. (# specimens not given)

Samuel cave — 3 specimens sp?
Hanner cave — 2 frag. specimens sp?

Pickthorn Miller 1935

Carpenters Miller 1931

Measurements of "average specimen"of tarsusof RLB C. occidentalis compared with type tarsometatarsus of C. shastensis from Potter Cr. Cave. Miller, 1911, Univ. Calif. Publ. Bull. Dept. Geol. 6(16):389 (C. shastense descriptions begins 388)

	C. occident.		C. shastensis	
Tarsometatarsus				
Total length	83.5		83.0	
Gr. transverse diam. thru head	16.0	19.1%	17.4	20.9%
Least transverse diam. shaft	7.2	8.6%	8.7	10.4%
Gr. transverse diam thru troch.	17.0	20.3%	17.9	21.5%
Gr. sagittal diam thru head	11.8		13.3	
Sagittal diam shaft at middle	5.9		6.9	
Sagittal diam middle trochlea	10.8		10.6	
Transverse diam middle troch.	7.3		7.3	
Humerus				
Length from dist. tub. of pectoral crest to depression for brachialis anticus	56.4		59.5	
Anteroposterior diam shaft middle	11.6		12.4	
Dorsiventral diam shaft middle	9.7		9.8	

10/1/67 To measure @ craig yr

Femora X

Radii X

Tarsus OK

Tibia meas prox + dist ratios
: shaft:

ulna shaft ratios

coracoid OK

Humeri OK

carpus OK

skulls compare species

See Condor 43: NY 41 pp 140-141

Passer & C. chalcensis

Says San Josecito + La Brea call + now
contain specimens (tarsi)

That "practically duplicate the type
specimen of C. chalcensis.

Cave Crag Pas

Dark Canyon (Unrecorded)

Left prox fibia #19
2 Rt dist ulnae 15, 16
1 Lft " " 98, #7
1 R prox ulna nearly yg 18
Left prox humerus 13
" " " yg 14
2 Left lowermed coracoid 11, 12
Rt dist tarsus 161

Hadrictis Wt Cave recorded
but no meas. given

See NOTES Prox end ulna 1 another 17,6 and 17,4
Breadth 18,5
Depth 16,6
Shaft 8,2

Tarsal shaft Rt, (yg) Br prox 16,4 (another)
breadth 7,8
Tarsal shaft left
breadth 6,6

Coracoid yg (duck where left taken)
length 60,9 another 64,8
br. at fact 11,6 12,5
ht from it 27,2
br sh 8,0

Carpometac
Br. troch 10,4
ht dist 18,5

Tibiotarsus

Conkling Cavern, recorded species
but no detail

See MS

For Natchitoches cave study

Extremes of size — small + large

Between sizes not measured

{ 173 Comp. coracoids still in basement
24 med in box
20 med large

Good specimens

Coragyps (LaBrea)

	a	b	c	d	Ratio cb		a	b	c	d
	smallest Length to top	length to tips	br at glenoid	br shaft						
D9249	61.6	61.2	11.9	8.3	19.8 OK	D8085	63.9	63.1	12.7	8.8
E259	63.0	62.2	12.0	9.1	19.2 OK	E66 broken	62.9	62.1	11.8	8.2
1+3869 Pit 13	eroded 63.4	ends 63.2	12.0	8.4	OUT	D7027	63.9	63.3	12.7	8.2
D9610	63.9	62.3	11.9	8.6	19.1 OK	D8474	64.1	63.0	11.9	9.0
E560	eroded tip 62.2	61.9	12.2	8.1	19.6 OK	D8720	64.0	62.5	12.0	8.7
F321	63.7	62.8	11.5	8.7	18.8 OK	1+3870 broken	62.5	63.1	11.6	8.0
X D8619	61.5	60.3	11.5	8.3	19.0 OK	D8380	63.9	63.0	11.6	7.5 X
	proximal ends					D8580	64.2	62.9	12.1	8.7
D8889	62.1	62.0	11.5	8.3	OUT		6)384.0	377.8	73.0	67.1
	at glenoid									
F1849	61.1	60.8	11.3 OK	7.8 X	18.5 OK	X D9257	70.8	69.8	13.0	8.9
E198		62.3	11.9	8.2	19.1 OK	D9736	68.6	66.9	12.4	8.7
E415	Pounded 62.5	62.3	12.1	8.6	19.4 OUT	D8185	68.4	67.5	12.1	8.3
E387	—	61.6	12.2	8.8	19.7 OK	D9215	68.8	67.8	12.3	9.2
D9274	eroded → 63.6	63.0	12.2	8.8	Out	E183	69.9	68.6	12.8	8.5
D7801 Cathartes?	35.9	35.3	12.0	9.3	OUT	D7261	68.1	67.5	12.5	8.8
D7224	62.9	61.6	11.8	8.7	19.1 OK	E252	69.0	67.0	13.1	9.4
D7684	64.1	63.1	12.3	9.4	19.4 OK	D7414	68.9	66.8 crushed	13.3 OK	8.5
D7512	63.6	63.1	12.2	8.5	19.3 OK	E6741	69.4	68.6	12.7	8.9
D8849	complete 63.3	61.5	11.6	8.1	18.8 OK	D7052	67.7	65.9	12.8	8.2
E543	63.6	62.9	12.2	9.4 X	19.4 OK	D7502	—	65.9	12.4	9.3
D8627	64.7	62.4	11.9	8.5	19.1 OK					
	12) 755.5	12) 730.0	12) 142.2	12) 102.4		10) 690.8	74.2	14.1	16.3	8.8
							73.2			

Rates cb 39 bones

6 bones ok

	cb	
20.1 OK	21.7	173
19.2 OK	25	24
OUT	9	20
20.1 OK		
18.9 OK	255	
19.2 OK		
OUT		
18.4 OK		
19.2 OK		
18.7%		
18.9		
17.9		
18.1		
18.6		
18.5		
19.5		
19.8		
18.5		
19.2		
18.8		
19.2		

4 upstairs mess

Condor carpometa

Natchitoches cave	length	br	
E1	149.0	16.4	11805
2	143.8	17.0	12502
3	—	16.0	38) 2430 7(6
			228
			150
			152

LaBrea sample

B2170	142.8	14.9	3259
B1448	142.9	14.8	2359
B7888	—	14.6	38) 4618 (12)
			38
			81
			76
			58

Turkey snake vein

cave	br 10.1	crush of largest facet 13.4	
E5445	11.2	13.0	16108
E6527	11.2	12.5	16308
			38) 3248 (8.5
			304
			208

cave scap does not have marked rise from large to small facet which characterizes Parapavo / Meleagris clavicle but still ? cave has no foramen but pneumatic excav. close to facet. Parapavo has foramen near tip cavity for ligament

coracoid about equal in length & smallest ♀ Parapavo which is 8.2 mm.
cane spec. inc can't be measured. No ridge runs down post. procoracoid in cane bone;
The area is rounded instead, Post. surface under scap. facet slopes forward
in cane bone, but is flat + partly dented in Parapavo. Procoracoid is pitted
(rounded in Parapavo. In Parapavo the ~~ridge~~ fuscular facet connects
with the internal part of the shaft by a ridge line from near the post border
of the fusc. facet. ~~Part. absent~~ 1 or 2 such ridges in cane bone – Area below fusc. facet
is quite open

		blunt end dorsal post. margin			
Eagle	Jaw br. artic.	artic. ant-post depth	Shaft Depth vert-dorsal	Thickness same at same place	
cane	19.7	12.8	11.8	4.0	
R.F.B.	20.4	10.6	11.0	3.6	
	21.4	10.8	10.6	3.4	
	23.0	12.1	11.2	3.8	

Brazilian records of Coragyps atratus

Lapa da Escrivania Nr. 5

Knogler af flere Individer, gamle og Unger

Lapa da Lagoa do Sumidouro.

Nogle faa Knogler, vist af én Fugl.

Der er fundet: Ledben (phalanges), Ravnenæseben (coracoid), Overarm (humerus), Albueben (ulna), Mellemhaand (carpometacarpus), andren Fingers første Led (phalanx), Laarben (femur), Skinneben (tibia), Løb (tarsometa), Mellemfaadens første Led (phalanx 1st part).

Cathartista atratus og Cathartes aura kunne temmelig let skjelnes efter de fleste Knogler.

Photo of 1 dist end humerus (Tj.) meas. 23.7 br.)

I clearly too small for occidentalis.

DeMay, 1941 Carpinteria, no reference to size or proportions just abundance

DeMay, 1941, McKittrick, Carn. Inst. Wash. 530:43-44,"Coragyps occidentalis is a somewhat larger and stouter bird than the living black vulture (C. atratus), according to the original description by Miller in 1909. The femur is longer and heavier, the tibiotarsus is shorter and stouter, the foot is wider, and the humerus is longer."

1912 Miller (Pacific Coast Avian Palaeontology, U.C. Pub. Geol 7:91
"As indicated in the note descriptive of Catharista occidentalis, the difference between the fossil and Recent forms lies in the greater body size of the fossil form accompanied by a difference in proportion of the segments of the posterior limb. The tarsus shows a greater degree of robustness, both absolute and relative. The humerus is slightly longer and stouter, but whether the wing expanse is increased to a degree commensurate with the increased body weight is questionable. We seem, then, to be dealing with a vulture that was of a heavier body and shorter limb than the persistent Catharista urubu. The difference becomes more signifi cant when it is noted that the character separating the extinct from the persistent species of Catharista is identical with one of those separating the more restricted Catharista urubu from the wider ranging Cathartes aura. It should also be noted that the extinct form Catharista shastensis from the caves is separable from the RLB species, C. occidentalis, by a greater robustness of the tarso-metatarsus and by a greater body size as indicated by its stouter coracoid. The cave form, the asphalt form, and the Recent form of Catharista thus fall with the Recent Cathartes into a series of progressively ligh er-bodied and possibly more strongly flying vultures, which display, in the cases of the last three at least a probressively greater ability to cope with their environment."

Miller, 1943. San Josecito U.C.Publ. Zool. 47(5):151
"Second only to the raven in point of numbers" (in all stages of individual development; many nestlings). Lists localities from which C. occidentalis recorded:

RLB, type loc., abundant	Conkling Cavern, abundant
Carpinteria, rare	Smith Cr. Cave, rare
McKittrick, rare	San Josecito Cav. abundant
Potter C. Cave, rare	Samwel Cave, rare

1909 Coragyps occidentalis (described under Catharista)

~~1911~~ Described in "Teratornis, a New Avian Genus from Rancho La Brea, U.C. Publ. Bull. Dept. Geol. 5(21):306, footnote.

Based on type no. UCMP 12509 tarsometatarsus (?)
Series of 21 partial skeletons from RLB. "Body larger as judged by skull, sternum and pelvis; femur longer and heavier (107%); tarsus shorter 94% but stouter (109%); foot wider (116%); humerus longer (108%)

1941 The passing of Coragyps shastensis Miller. Condor 43:140-141 (LMIller) Says San Josecito and RLB Coragyps are same species,"and within each series there can be found individual tarsi that practically duplicate the type specimeh of Coragyps shastensis" (no meas. given)

Other references to C. occidentalis

Miller, 1931 U.C.Pub. Bull. Dept. Geol Sci. 20, 364 Carpinteria) np meas.
DeMay, Carnegie Inst. Wash. Pub. 530:65 "
Miller 1935, Condor 37:72-79 McKittrick
DeMay, Carnegie Inst. Wash. Pub. 530:43 McKittrick 1941
Howard, 1952 Bull. So. Calif. Acad. Sci. 51(2):53054, Smith Creek Cave
Miller Carnegie Inst. Wash. Pub. 349:86 RLB, 1925 chars. as in typedescription no meas. *
Howard, Condor 32:81-88, RLB, 1930 census paper
Howard, Condor 37:206, Smith Creek Cav, 1935
Miller, 1943, U.C.Publ Zool 47:151, San Josecito Cave
Howard, Condor, 1962 vol. 64:242, Hatchita Mt. Cave, N.MEx.

Howard, 1962 Bird remains from a prehistoric cave deposit in Grant County, New Mexico. Condor, 64:241-242. "There are 22 bones of this bird (C. occidentalis), seven of which show immaturity. At least two adult and two immature individuals are represented. A symphseal portion of furcula agrees with C. occidentalis, as contrasted with C. atratus, in greater obtusity of the arch. Seven measurable specimens of limb bones (ulna, carpometacarpus, tibiotarsus and tarsometatarsus) exhibit the considerably greater breadth characteristic of the Pleistocene species as noted in a series of bones in the RLB collection at LACM. Examination of the fossil series of over 20 coracoids reveals only one specimen as short(as an immature coracoid from Hatchet Mt), but several as slender."

* Miller, 1925 RLB Carnegie Pub. 349
Fossil bird (compared with C urubu) is larger of body as judged by skull, stenume, and pelvis; femur longer by 7 %, tarsus shorter by 6 %, but stouter by 9 %, foot wider by 16%;humerus longer by 8%."
Practaically what was said in footnote type description.

Records of C. occidentalis

RLB Miller 1909 No measurements -- percentage proportions

Carpinteria Miller, 1931 -- absent from fauna # 2, represented in fauna # 1 (which was more tar impregnatedthan #2) by complete tarsus and coracoid. No reference to size
DeMay 1941 says 13 bones, 4 indiv. (no meas. or discussion)
McKittrick Miller 1935 Condor #37:72

De May Carn Inst. Wash. 530:43, " a somewhat larger, stouter bird than the living black vulture (C. atratus) according to original description by Miller. "The femur is longer and heavier, the tibiotarsus is shorter and stouter, the foot is wider, and the humerus is longer."
NOTE: Does she mean tarsometatarsus not tibiotarsus? For the Tibiotarsus is NOT shorter (nor is the tarsometatarsus for that matter, but the type description said it was. The tibiotarsus is notably longer. (138 - 153 mm.; Recent, 133.2 -146.1).
mean 146 mean 140
Tarsometatarsus fossil Recent
78.3 82.9 88.7 76 - 83 - 86

Shasta County Miller 1911. Measurement of average C. atratus from RLB with type of C. shastensis. Tar sometatarsus, Humerus.
26 bones of shastensis Potter Creek Cave
3 " " Samwel Cave
7 " " Hawver Cave (in list appears thus but text says only 2 are assigned "with some reserve."

Smith Creek CaveHoward, 1935 1 fragment tarsometatarsus
" 1952 another specimen recorded
No comment on characters

Conkling Cavern Howqrd and Miller 1933 listed without indication of size or abundance (NOTE: Check to see if pencil notes are correct, 56 bones). In the 1933 paper we say Coragyps present "in great numbers"

Hachita Cave, Howard 1962. 22 bones of C. atratus (7 immature) Character of furcula given as symphyseal portion more obtuse of arch. Seven measurable specimens of limb bones (Ulna, carpometacarpus, tibiotarsus and tarsometatarsus) "exhibit the considerably greater breadth characteristic of the pleistocene species as noted in a series of bones in the RLB coll. at the LACM. One wellpformed, but texturally immature coracoid is almost as small and slender as C. atratus (Fossil series of over 250 reveals only 1 as short but several as slender. Two adult coracoids in cave material fall well i to size range of C. occidentalis in all dimensio s. NO Acutal measurements given

San Josecito Cave Miller 1943. Second in abundance to raven. Check discussion in Miller 1941 (Condor.vol.43:140) "Suffice it to say here that the birds appear to be identical." (that is the Mexico and the California Lots of nestlings. Lists 8 localities for C. occident. RLB, Carpin. McK, Conkling, Smith Creek, Potter Creek, Samwel (omits Hawver yet he lists it from there earlier)

Oregon midden Miller, 1957 p. 61 Two fragments 1640 and 1545 "found to fit perfectly together making up an almost complete right humerus. Distal articulations beyond the brachial depressio are wanting but the strongl curved shaft distinguishes

from Cathartes. Bone is stouter than some of those of C. occidentalis from RLB, but is a perfect match for others in the series." State of preservation is the same as that of the other bird bones. Makes a statement that I would like to have the references for: This species (C. occidentalis), widely distributed in Pleistocene time, has been found in cave deposits, sometimes almost certainly associated with Basketmaker artifacts at deeper levels but givi g place at upper levels to Cathartes aura or Coragyps atratus."
WHERE HAS IT GIVEN PLACE TO C. ATRATUS??

Florida Reddick Brodkorb 1957 Jour Paleon.

Florida Arredondo Brodkorb (in press 1964)

Texas Friesenhahn Cave, Brodkorb (in press 1964)

Check C. atratus need O. Wings. 1887 from Brazil

Wetmore 1932 Rocky Arroyo "Humerus and coracoid of a Black Vulture (Coragyps atratus) that makes an extension of range for that species, since in modern times this bird has only been recorded west to western Texas, and has not been found in New Mexico." p. 141.

Same citation: Hawikuh Pueblo 12 mi SW of Zuñi N.M., a section of a metacarpus "that agreed in form with the Black Vulture." Too fragmentary to identify. Date (15 yrs ago) now with the new Rocky Arroyo can put the sp on record for N.M. Date for Hawikuh middle 15th cent. & 1670. Arroyo arroyo probably 2000 yrs old (2½ - 8' depth in cave / finds below Bat-

Wetmore, 1931. "Cuneiform part of metatarsus, tibio-tarsus, coracoid humerus & metacarpal" - Seminole Field

At Salt-Tarth Cave, Lecants = bones, duthers

C. atratus is known today in Florida Cuba in Mexico Puerto Rico Bolivia Chile & Argentina

Smaller in size & form to those of modern adults."

Black vultures were abundant than Turkey Vultures at fossil record of Rancho.

McCoy, John J. 1963, Auk 80: "C. atratus, left tarso-metatarsus Pleist assoc. Camplus & Terry cave C. matthewsi bones"

Poulter 1932 Californian C. occi.

absent from fauna II = 2

rep in fauna III 1 by complete humerus & coracoid

mentions living sp. found in "sylvan environment"

Too has been seen in cactus desert near Tucson.

C. occ. abund at La Brea, Spanish rep at Rancho [& Camp.]

C. shastensis sylvan probably.

(fauna # 1 more far impregnated than # 2

The extinct black vulture, Coragyps occidentalis, was described (Miller, 1909:306) in a footnote. A tarsometatarsus, from the Rancho La Brea Pleistocene (Univ. Calif. Mus. Paleon. no. 12509) was named as type, and other elements mentioned. The description, based on a comparison with Recent Coragyps atratus (Bechstein), reads as follows: "Body larger as judged by the skull, sternum and pelvis; femur longer and heavier (107 %); tarsus shorter (94%) but stouter (109%); foot wider (116%); humerus longer (108%)."

Not until two years later (Miller, 1911:389) were measurements "of an average specimen" of C. occidentalis from Rancho La Brea recorded. Figures were given for both a tarsometatarsus and a humerus in comparison with the same elements of the vulture from Potter Creek Cave, Shasta County, California, described as Coragyps shastensis. Comparable measurements of the Recent C. atratus were not given. Later, Miller (1941) declared C. shastensis to be synonymous with C. occidentalis.

Coragpys occidentalis has now been recorded from twelve Pleistocene deposits and one Recent midden (see list in Brodkorb, 1964:254-255) The Recent species, C. atratus, also has been recorded from six North American Pleistocene sites (op. cit.). No measurements of the elements recorded were given in any instance, except as noted above. The records have appeared in my name, and In making the identifications I had at my disposal the large collection from Rancho La Brea at the Los Angeles County Museum of Natural History. Many measurements were made during these studies, but never published. They revealed the fact that conclusive distinction from the museum collections now include specimens from Potter Creek Cave (formerly collection of Loye Holmes, Dept. of Vertebrate Paleontology) and two additional Recent skeletons of C. atratus are now at hand.

Percentage figures for other elements are notably:
Coracoid 109%, ulna 106%, carpometacarpus 109%, tibiotarsus 103%

Although the percentage figures indicate generally larger, stouter bones throughout the skeleton of C. occidentalis, there is a zone of overlap with some elements of the Recent C. atratus, which with an incomplete specimen could cause confusion of identification. There is little likelihood that this could occur in either the humerus or the femur. In each of these elements there was only one instance of overlap and this in a single dimension. In the thirty ulnae measured, however, six fall within the size range of C. atratus in length and in depth of shaft, and two of these overlapped in breadth of proximal end as well. There was no specimen in which all dimensions overlapped, but an incomplete specimen might prove problematical. Out of 33 carpometacarpi measured, one overlapped the maximum in the range of C. atratus in both length and breadth measurements; thirteen other overlapped in one or two dimension.

In twenty fossil tibiotarsi, five are within the range of length of the Recent species, but none are as narrow across the distal end. Well over half the 64 tarsometatarsi of C. occidentalis from Rancho La Brea fall with the range of C. atratus in length and in breadth of distal end; but only eleven have as slender a shaft, and none are as noarrow across the proximal end.

CORACOID??

MORE MEASUREMENTS of MCK, Carpinteria, San Josecito.

REMEASURE ALL CORACOIDS to back of internal tip

REMEASURE Conckling Cavern ulnae
MEASURE prox. br. tibiotarsus and more length and dist.

The longer humerus of C. occidentalis falls within the size range of Cathartes aura. Cathartes is, however, readily distinguishalbe from Coragyps on the basis of the straighter shaft and the

marked medial slant of the deltoid crest, terminating in a amall, papilla in the center of the anconal side of the shaft. The long ulna of C. occidentalis does not quite equal that of Cathartes aura, and the two genera are further distinguishable by the much more blunt olecranon in Cathartes. The carpometacarpus of Cathartes is distinguishable from that of Corag ps in having a longer poximal symphysis and, at the distal symphysis, metacarpal 3 is raised above the distal end of metacarpal 2, wheras in Coragyps ~~xxx~~ it rounds into M2 at the symphysis.

10.7.67

As vulture bones continue to be discovered in both archeological and paleontological sites, I believe it is of importance now to record measurements be recorded. When viewed in series, the specific distinctions of some individual specimens are not clearly indicated, especially when dealing with the fragmentary incomplete bones. Possibly the tables that follow may stimulate further study careful analysis of all the occurrences of fossil and "prehistoric" Coragyps with a view to determining the geologic and geographic distribution of the two species. Or, whether actually two species are represented or whether we are again faced with the interesting problem of a possible chronocline. Should we discover that the two forms existed at the same time but in different geographical areas, the trinomial might well be considered. A great deal more study will be required before the answer can be obtained. study of all elements of the fossil C. occidentalis in great detail, as well as close attention to the characteristics of all Coragyps bones recovered from both fossil and "prehistoric" sites.

As a start in such an analysis, I have included with the Rancho La Brea and Recent Coragyps atratus material in the tables that follow, the corresponding maximum and minimum measurements of available specimens from the several recorded sites that are now represented in the Los Angeles County Museum of Natural History collections. These are: San Josecity Cave, Mexico (former Calif. Institute of Technology collection recorded by Miller, 1943); McKittrick and Carpinteria (Calif. Inst. Tech. colls. recorded by Demay 19 and 19); Smith Creek Cave, Nevada (Calif. Inst. Tech. coll. recorded by Howard, 1935); Conkling Cavern New Mexico (Howard and Miller, 1933); Hachita Cave (Howells Ridge), New Mexico (Howard, 1962). While studying the material from the last-named site, the coracoid from Rocky Arroyo, New Mexico recorded (C. atratus) by Wetmore 1932) was measured, and is included here.

(1)

10.4.67

The type of the extinct black vulture, Coragyps occidentalis, is a tarsometatarsus (Univ. Calif. Mus. Paleon no. 12509) from the Pleistocene of Rancho La Brea, California. Miller (1909:306) described the species in a footnote, with the following diagnosis: "Body larger as judged by the skull, sternum and pelvis; femur longer and heavier (107%; tarsus shorter (94%) but stouter (109%); foot wider (116%); humerus longer (108%)."

~~Two years later~~ Soon after (Miller, 1911:388-389) named the species Coragyps shastensis ~~was described~~ from Potter Creek Cave, Shasta County California, discussed the type tarsometatarsus (Univ. Calif. Mus. Paleon. no. 8603) ~~was described~~ in detail, ~~including~~ measurements were compared with "an average specimen" of C. occidentalis. A partial humerus of each species was also measured at this time. Thirty years later Miller (1941), having encountered extinct Coragyps in a number of other localities, and in greater abundance from Rancho La Brea ~~than formerly~~, noted that the later collections contained tarsometatsrsi that "practically duplicate the type specimen of C. shastensis." Thereupon, he declared the name C. shastensis to be a synonym of C. occidentalis. Coragyps has now been recorded from twelve Pleistocene deposits, and one Recent midden (see list in Brodkorb, 1964:254-255), and the Recent species, C. atratus, also has been cited from eight Pleistocne localities, as well as several "prehistoric" sites. Yet, throughout all these reports, the 1911 notation by Miller supplies the only published record of actual size of any of the Coragyps bones.

In preparing the records of the species ~~Coragyps occidentalis~~ from these deposits ~~cave deposits in New Mexico and Nevada~~, I made extensive comparisons with specimens in the Los Angeles County Museum collection from Rancho La Brea. At least 195 individual birds are represented by the quantities of specimens of each element of the skeleton. ~~Although all specimens~~ Most of the bones were examined in the museum ~~not measured during~~ these studies, and a representative series of each element, each of the main limb element was measured, including the maximum minimum in length and a random group between.

Have all the Shasta cave material in C.o. in cave dep. in N. Mex & Nevada been extended over a period of 30 years.

In the interest of brevity, the identification of the cave material was recorded without inclusion of the details of measurements. Within the last few years, since the Calif. Inst of Tech., & have had occasion of reviewing the Caraggus material from Calmuteria + McK. cave and the San Josecito material recorded by De Kay, Each of these occurrences of Coraggus obviously conforms to the original description of C. atratus. in generally stouter bones than those of C. atratus. There is however a notable trend from the PLB assemblage to the more slender bones from San Josecito. notable trend towards lesser length of elements from San Josecito as compared to those from PLB, and contrarivise a suggestion of greater length in the McK. group

Complete specimens from McKittrick, Carpinteria, Smith Creek Cave, Conkling Cavern and Hachita Cave are few. No detailed comparison with the RanchoLa Brea assemblage is therefore possible. However, with the exception of the tarsometatarsus and femur from McKittrick, which exceed the Rancho La Brea series, all the bones from these localities fall within the range of Coragyps occidentalis in size and proportions, and presumably represent this race. Although the dimensions of some of the bones fall within the size range of C. occidentalis mexicanus, others notably exceed the Mexican form. It is obvious from Tables 1-7 that there is overlap in some dimensions between Coragyps occidentalis and C. atratus. In dealihg with incoplete fragments, therefore, a definite identification may be unwise, and one should guard against a tendency to be influenced by geologic age or geographic area.

In order to determine the true geologic and geographic range of races of C.occidentalis as compared with C. atratus, attention to accurate recording of dimensions is especially needed wherever Coragys bones are found, either as fossils or in archeological sites, within the present geographic range of C. atratus. The discovery that Pleistocene Coragyps paralells Recent Coragyps in the presence of a smaller Mexican race raises the interesting question of whether the heavier form throughout a large geographic range, given C. occidentalis could be directly ancestral to later more slender C. atratus, could have given rise thoroughout a wide geographic range, to the more slender C. atratus. To date there has been no attempt made to determine whether or not the two species

Although both species have been recorded in both Pleistocene and prehistoric deposits, a careful analysis of these occurrences, with careful attention to comparative measurements should help to answer this question

The fragmentary condition of most of the available

Except as noted, the figures in the tables refer to the entire series of each element, and do not reflect the proportions of individual specimens. It was at first thought that there was a reverse correlation between length of bone and relative breadth of shaft in the tarsometatarsus. A bone-by bone analysis indicates that although there is a tendency for the relatively broadest bones to be among the shortest, the correlation is not infallible.

Of the eleven tarsometatarsi with shaft over 10 per cent of length, seven are below the average length, but four are slightly above (none, however exceeds 84.1 mm.). Of eleven bones whose relative breadth is less than 9.0 per cent of the length, six are above average in length, two are average and three are below average length (79.8-82.5mm.)

McK, 1 long tarsus, 2 broader femur distal + sh.,
calc 1 broader prox tarsus, ~~1 broader tarsus~~ ulna shaft, ~~1 broader carpo shaft~~

The fragmentary condition of most of the available specimens from Smith Creek Cave, Carpinteria, McKittrick, Conkling Cavern, and Hachita Cave preclude the possibility of critical comparison with the Rancho La Brea series.

From Conkling Cavern, the humerus is close to the average of the RLB series (the proximal end ~~xxxxxxx~~ slightly greater relatively); the ulnae the carpometacarpus is slightly above the RLB average; only breadth can be measured in the femora, and this falls close to average; The tibiotarsus is greater than average length, but average or less than average breadth; the single tarsometatarsus is immature, so measurements are unreliable, it would seem, however, to ??? be less than average size. On the whole, the Conkling Cavern ~~bird~~, conforms very suitably to the RLB series.

The San Josecito representatiion, however, is sizable and provides a clear picture of the bird. Compared to the RLB series, the each element in the Mexican assemblage ~~xxxxxx

Oct 15, 1967

A ~~COMPARISON OF~~ LIMB MEASUREMENTS OF CORAGYPS OCCIDENTALIS FROM SEVEN PLEISTOCENE LOCALITIES IN THE SOUTHWEST

The type of the extinct black vulture, Coragyps occidentalis, is a tarsometatarsus (Univ. Calif. Musl Paleon. no. 12509) from the Pleistocene of Rancho La Brea, Cal fornia. Miller (1909:306) described the species in a footnote, with the following diagnosis: "Body larger as judged by the skull, sternum, and pelvis; femur longer and heavier (107%); tarsus shorter (94%) but stouter (109%); foot wider (116%); humerus longer (108%).

Soon after, Miller (1911:388-389) named the species Coragyps shastensis ffom Potter Creek Cave, Shasta County California, describing the type tarsometatarsus (Univ. Cal f. Mus. Paleon. no. 8603) in detail. Measurements were co pared with "an average specimen2 of C. occidentalis. A pa tial humerus of each species was also measured at this time. Thirty years later, Miller (1941), having encountered extinct Coragyps in a number of other localities, and in great abundance from Rancho La Brea, noted that these later collections contained tarsometatarsi that "practically duplicate the type specimen of C. shastensis." Thereupon, he declared the name C. shastensis to be a synonym of C. occidentalis.

Coragyps occidentalis has now been recorded from twelve Pleistodeposits, and one Recent midden (see list in Brodkorb, 1964:254-255), The Recent species, C. atratus, also has been cited from eight Pleistocene localities, as well as several "prehistoric" sites. Yet, throughout all these reports, the 1911 notation by Miller supplies the on y published reocrd of actual size of any of the Coragyps bones. Coragyps occidentalis material from six of these Pleistocene localities, in addition to the very large representation from Rancho La Brea, is now available in the collections of the Los Angeles County Museum of Natural History. ~~Three of these sites were recorded by me.~~

The records from three of these localities resulted from my own studies: Conkling Cavern, New Mexico; Smith Creek Cave, New Mexico; and Hachita Cave (Howell's Ridge), New Mexico. The material from Carpinteria and McKittrick asphalt deposits of California (recorded by De May, 1961 and 1962) and that from San Josecito Cave, Mexico (recorded by Miller, 1943) all originally in the Calif. Inst. of Technology collections, has now been acquired by the Los Angeles LACM museum. The large Rancho La Brea collection of Coragyps occidentalis bones has never been reported upon in detail. At least 195 individual birds are represented by the quantities of specimens of each element of the skeleton of C. occidentalis in this collection. I examined most of this material for purposes of comparison with the cave material recorded; and a representative series of each of the main limb elements has been measured, including the maximum and minimum in length and a random group between. The maximum, minimum and mean of these measurements and accompanying proportions are presented in the following tables, together with comparable figures for a series of six Recent skeletons of C. atratus and such measurements as can be made on the material from the other six Pleistocene localities.

The smallest of the Recent specimens (LACM 1360) was collected in Oaxaca, Mexico. Its notably smaller size than the other specimens suggests that it may represent the subspecies Coragyps atratus brasiliensis (Bonaparte) (see Wetmore, 1962). In most elements the largest specimens are those from Texas and Florida, but these equalled in length of carpometacarpus and surpassed in length of tarsus are by a specimen from Guatemala.

At least 195 individual birds are represented by the quantities of specimens of each element of the skeleton in the Rancho La Brea collection./ I have examined most of these bones; and a representative series of each of the main limb elements has been measured, including the maximum and minimum in length, and a random group between. In

start

The elements measured are coracoids, humeri, ulnae, carpometacarpi, femora, tibiotarsi and tarsometatarsi. Maximum, minimum and mean lengths are given for each element, and breadth measurements taken through the shaft and/or at the ends. The number of fossil specimens measured varies from 20 to 60, the tarsometatarsus, which has been used as the type element of Coragyps occidentalis is the most critical. Measurements of Coragyps atratus were made on four Recent skeletons in the Los Angeles County Museum of Natural History (Lacm) collection and two in the L.H. Miller collection at the University of California at Los Angeles. The smallest Recent specimen (Lacm 1360) came from Oaxaca, Mexico. The largest specimens came from Florida and Texas, but neither of these is outstandingly superior, and in one or two elements they equalled or exceeded in length by a skeleton from Guatemala. ~~The sex is not indicated on any of the Recent specimens.~~

There is a tendency for the relatively broadest bones to be among the shortest (of the eleven tarsometatarsi with shaft over 10 per cent of length, seven are below average length, two are above average and two are average); correlation of slender bones, to greatest length is less clearly defined (of the eleven tarsometatarsis with shaft under 9.0% of bread length, five are of above average length, three are below average, and three are average)

compared. The results, shown in the following tables, reveal some interesting facts concerning possible geographical, or geological variability within the species C. occidentalis. At the same time, the figures ~~tend to~~ strengthen the distinction between C. occidentalis and ~~Ex~~ the Recent C. atratus, and suffply additional data

The following abbreviations are used: ~~R~~ RLB, Rancho La Brea; MCK, McKittrick; Carp, Carpinteria; CC, Conkling Cavern; HC, Hacienda Cave; SCC, Smith Creek Cave; SJC, San Josecito Cave. The number of specimens ~~available for measurement~~ is shown in parentheses ~~under each site~~. ~~All measurements were made~~ Where ~~measurements could be made~~ on each bone, however, ~~the~~ meas is in sets or less

1) Mean one cannot be compared with this dimension where measurement is omitted, nor 2 where mean of ~~less than 10~~ measurements could be made on each bone, however, ~~the~~ meas is in sets or less

The foregoing tables not only provide actual measurements of Recent and extinct Coragyps which can be used as a yardstick in future identification, but they reveal a number of significant facts regarding skeletal proportions which may be added to the diagnosis of C. occidentalis. First, it is shown in the RLB series that even the tarsometatarsus, which was diagnosed as 94% shorter than in C. atratus, has an average length only two-tenths of a millimeter below the average for this element in C. atratus (99.9%) and exceeds the Recent form in both its maximum and minimum measurements.

Regarding the humerus, not only are all the RLB humeri longer than any C. atratus specimen measured, but dimensions of proximal and distal breadth are greater as well; a single specimen has a least breadth of shaft as narrow as the maximum in the Recent form. Relative breadth of ends and shaft are within the range of these proportions in C. atratus, but average greater. The length of the humerus is accentuated when comparison is made with the tibiotarsus. In C. atratus, the tibiotarsus only in each index, but in series (average portion 103% longer than the humerus whereas in C. occidentalis, the reverse is true. The case, the average of the series of tibiotarsi of 98.9% of the average for the humeri, for humeri).

The ulna and carpometacarpus, which did not figure in the original diagnosis, are found to be of considerably greater average length and breadth in the extinct form, although there is some overlap with the size range of C. atratus. No one specimen in either element, however, falls within the range of C. atratus in all dimensions. Possible confusion between the species could occur in dealing with fragmentary material.

The femur, which was diagnosed as 107% longer and stouter in the Rancho La Brea form, is found to exceed this percentage both in length and in breadth; in comparison with the Recent C. atratus skeleton available the RLB series is found to be 111-114% longer and 112-115% stouter than in C. atratus.

The San Josecito Cave assemblage is sufficiently large to provide significant comparison with that from Rancho La Brea. Every element in the Mexican group averages shorter. Furthermore, well over half the specimens of each element fall below the mean of the Rancho La Brea series. See Table 9

Table 9

Comparison of Assemblages from Mexico with that from Rancho La Brea

	Number of Mexican specimens	Number of specimens below mean of RLAB	Percent below	Number of specimens below minimum of RLB
Coracoid	40	35	175%	NONE 6
Humerus	10	8	80%	2
Ulna	20	17	85%	2
Carpometacarpus	21	21	100%	NONE
Femur	16	16	100%	1
Tibiotarsus	18	18	100%	3
Tarsometatarsus	20	18	90%	6

With the exception of the tarsometatarsus which are relatively shorter in Coragyps occidentalis than in C. atratus,

Compared with C. atratus,

Although closer to C. atratus in length of

All elements, however, have the ~~xxx~~ relative stoutness that characterizes Coragps occidentalis as distinguished from C. atatus There is, in fact, a slightly greater average stoutness in the Mexican specimens than in those from the type locality. Also ~~char-~~ ~~acteristic of~~ with C. occidentalis are the ~~xxxxxxxxxxxxxx~~ relative ~~xxxxxx~~ lengths of the skeletal elements. ~~The relatively small size of the tarsometatarsus~~ ~~and tibiotarsus and the relative large size of the humerus~~ are demonstrated in Table 8 ~~demonstrated by the ratios xx obtained by comparing maximums with maximums, minimums with minimums and means with means. In C. atratus~~ ~~although~~ ~~, there~~

The San Josecito Cave assemblage is sufficiently large to provide a significant comparison with that of Rancho La Brea. Every element in the Mexican group averages shorter than the corresponding element from RLB, Furthermore, all specimens of Carpometacarpus, Femur and tibiotarsus, 90% of the tarsometatarsi, 85% of the ulnae, 80% of the humeri and 75% of the coracoids Of sixteen Mexican femora, one falls below the minimum for the RLB form;

Number specimens	Percent below average RLB

Number specime

The foregoing tables not only provide actual measurements of Recent and extinct Coragyps that can be used as a yardstick in future identifictions, but they reveal a number of significant facts regarding skeletal proportions that may be added to the diagnosis of C. occidentalis.

While in general the diagnosis remains the same for those elements that are mentioned, the exact percentage distinctions are slightly altered when observing the larger series. The tarsometatarsus is actually about the same length in the fossil and Recent species, but relative to the rest of the skeleton it is shorter. The tibiotarsus, also is relatively shorter. Comparing the maximums, minimums and means of the tibiotarsi and humeri of the two species shows that the tibiotarsus exceeds the humerus in length in the Recent form, but is shorter than the humerus in the fossil. (see table) It is notable, also, that not only the tarsometatarsus and femur are stouter in the fossil, but all other elements as well, have at least an average greater breadth.

Table 8

Skeletal proportions of C. occidentalis and C. atratus

	C. occidentalis RLB	C. atratus
Ratio of tarsal length to humeral length	55 - 57%	60-61%
Ratio of tarsal length to femoral length	86 - 88 %	96 - 98 %
Ratio of length of tibiotarsus to length of humerus	96 - 99 %	103 - 106%

The foregoing tables not only provide actual measurements of Recent and extinct Coragyps that can be used as a yardstick in future identification, but they reveal a number of significant facts regarding skeketal proportion that may be added to the diagnosis of C. occidentalis. Not only tarsometatarsus and femur are stouter in the fossil, but all other elements, as well, have at least an average/greater stoutness.

It would appear, therefore, that in the Pleistocene ~~xoxcxex~~ ~~wasxrexexxsxexixx~~ ~~xxxixxthexxxcxnx~~ even as today, there was a size distinction between the more northerly representative~~x~~ of the species and that of Mexico. Whether or not this is an indication that the Pleistocene form was a direct ancestor of C. atratus, but it is suggested.

refer to
need to check
Pleist records
of C. atratus
& fig. maybe used.